

RISK REDUCTION AND THE AUDIT REVIEW PROCESS

By

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by

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This dissertation is dedicated to my wife, Caroline.

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TABLE OF CONTENTS

ACKNOWLEDGMENTS	iv
ABSTRACT	viii
CHAPTER	
1 INTRODUCTION	1
Background	1
Statement of the Problem	3
CHAPTER	
2 MODEL DEVELOPMENT AND RESEARCH HYPOTHESES	6
Model of the Review Process	6
Risk Reduction in the Review Process.	10
The Risk of Failing to Detect Material Misstatement	10
Reviewer's Perception of Risk	11
Location of Risk and Risk Type in the Model of the Review Process	13
Factors Affecting Risk Reduction in the Review Process	15
General Audit Experience: Returns to Review Hierarchy	15
Specialized Knowledge: Returns to Specialization	19
Processing Mode (Individual Versus The Review Team)	22
The Interaction of Hierarchy, Specialization, and Processing Mode	23
Effect Of Perceived Risk	24
CHAPTER	
3 METHODOLOGY	26
Experimental Design	26
Description of Factors	27
Mitigating Confounding of Industry Specialization with Case	30
Cases Materials	32
Case Development	40

Case Content	41
Seeding of Errors and the Nature of Errors in the Error Rating Task	44
Case Evaluation and Pilot Test	45
Subjects	46
Selection of Subjects	48
Constructed Review Process Teams	48
Pre-Matched Team Members	50
Procedures and Administration	53
Error Rating Task	55
Development of Seeded Errors	55
Nature of Errors in the Error Rating Task	56
Error Task Evaluation and Pilot Testing	56
Procedure and Administration	57
Subjects	57
Error Categorization Metric.	58
Dependent Variables	62
Measurement of the Dependent Variable- Risk Reduction	63

CHAPTER

4	RESULTS	68
	Manipulation Checks	68
	The Role of General Audit Experience in Reducing Risk	73
	Hypothesis 1: Risk Reduction Returns Due to Experience: Who Detects Mechanical and Conceptual Errors?	73
	The Sequential-Hierarchical Review Process Hypothesis	77
	H3: The Effect of Individual Versus Team Processing.	77
	The Senior versus the Review Team	80
	The Role of Industry Specialization Hypotheses	82
	Hypotheses 2: In Specialization versus Out of Specialization Processing	82
	The Interactive Role of Review Hierarchy, Specialization and Processing Mode.	87
	H4 (a) and H4(b): The Joint Role of General Experience, In versus Out of Specialization and Processing Mode on Risk Reduction	87
	The Perceived Risk of Misstatements	97
	H5: The Effect of Work Paper Review on the Reviewers' Perceived Risk of Material Misstatement	97

CHAPTER

5	SUMMARY AND DISCUSSION OF RESULTS	103
	Summary of Results	103
	Discussion of Results	104
	General Discussion.	105
	Implications for Audit Practice	106
	Suggestions for Further Research	107

APPENDICES

A	CASE INSTRUMENT	108
B	ERROR RATING TASK	146

REFERENCES	160
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BIOGRAPHICAL SKETCH	166
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This dissertation examined risk reduction in the audit review process and whether review hierarchy, industry specialization, and processing mode reduce the risk of material misstatement. Auditors are motivated to reduce the risk of material misstatements because (1) they are subject to legal liability from clients and users, and to sanctions from the Security Exchange Commission (SEC), and American Institute of Certified Public Accountants (AICPA), (2) they want to maintain their reputation, and (3) clients can change auditors. Isolating the factors that can increase the effectiveness of the audit review process will assist public accounting firms in identifying ways to improve the review process.

One hundred and forty-four auditors (72 managers and 72 audit seniors) who possessed specialized industry knowledge participated in the study. Half of the subjects possessed industry specific knowledge and experience in healthcare audits and the other half possessed industry specific knowledge and experience in banking audits. Each subject performed two working paper review tasks, one in their specialization and the other out of their specialization. They completed one of these tasks either as individuals

or as part of a team. In the individual condition, audit seniors and managers within each specialization, reviewed work papers prepared by a banking and a healthcare staff member. In the team condition, an audit manager reviewed an audit senior's (from the same industry) review of a banking or healthcare staff's work papers. The purpose of the task was to determine whether the second level review leads to a greater detection of misstatements than the first level review and whether specialized industry knowledge is advantageous in this process. A second set of subjects (expert audit partners) rated errors on frequency, relative importance, conceptuality, and detectability in their respective industries. The data was used to provide an independent measure for testing selected hypotheses.

The results show that general audit experience significantly affected the amount of risk reduced. The amount of risk reduced when managers reviewed the work of seniors was larger than the amount of risk reduced when managers or seniors worked individually.

Specialized industry knowledge was found to have a significant effect on risk reduction. Auditors who worked in their specialization significantly reduced more risk than auditors who worked out of their specialization. This effect also extends to teams where a manager reviewed the work of a senior, however, teams working out of their specialization are not significantly better than managers working individually in or out of their specialization.

With respect to who detects which error type in the review hierarchy, the results show that audit seniors detected mechanical errors better than audit managers while audit managers detected more conceptual errors than the seniors. The results also revealed a significant interaction effect of general audit experience, specialized knowledge, and processing mode on risk reduction. As the level of auditor increases, more risk is reduced by auditors who worked in their specialization than auditors who worked out of their specialization, whether as individuals or as teams.

The perception of risk before and after the review was significant. In general, auditors (in review teams, as managers or seniors) perceive a lower risk of material

misstatement in the work papers prepared by a subordinate after the review of the work than before the review. However, auditors (managers and seniors) working individually perceived a greater reduction in risk than a team consisting of both a manager and a senior.

CHAPTER 1 INTRODUCTION

Background

A major objective of an audit is to issue an opinion on a set of financial statements. While the type of audit opinion issued will vary according to the circumstances of the engagement, the major decision error that an auditor can make is issuing an unqualified opinion on a set of financial statements that contain a material misstatement. Studies of auditor decision making¹ indicate that auditors often suffer from shortcomings due to heuristics and biases (non-sampling risks).² To mitigate these shortcomings, public accounting firms take several steps when conducting an audit to ensure that the risk of failing to detect material misstatements in a set of financial statements is reduced to an acceptable level. One step used by public accounting firms to control audit quality is the audit review process (Rich, Solomon, and Trotman 1997; Solomon 1987; Libby and Trotman 1993; Roebuck and Trotman 1992). The review process is a normal and critical part of every audit engagement.

¹ See Ashton (1983), Joyce and Libby (1982), Smith and Kida (1991), and Solomon and Shields (1996) for reviews of this literature.

² An auditor is also subject to sampling risk as a result of examining a portion or a sample of documentary evidence and drawing inferences from the incomplete information (i.e., uncertainty enters into the auditor's conclusions).

Audits are conducted by a hierarchical team of auditors, typically composed of a partner, manager, senior, and one or more staff.³ Generally, the audit is planned by the partner, manager, and senior. Most of the detailed audit work is performed by the senior and staff; and each person's work is reviewed by the person one level above them. The partner uses the reviewed work of the audit team as the major evidential support for the audit report issued.

The audit review process uses more experienced members of the audit team to supervise and review the work product of less experienced, subordinate team members. The work product of the audit team is documented in the working papers and mainly serves (1) to provide the principal support for the auditor's report and (2) to aid the auditor in the conduct and supervision of the audit (AICPA 1996, AU 339.02). More specifically, the working papers prepared by subordinate team members are reviewed by superiors (1) to ensure compliance with Generally Accepted Auditing Standards (GAAS) and firm policies, (2) to minimize exposure to risks such as legal liability, and (3) to monitor audit costs.

The review of working papers for compliance with GAAS and firm policies ensures that the audit work on the client meets the guidelines set forth in the audit plan;

³ For the purposes of this dissertation, it is assumed that the engagement is staffed with this hierarchical structure. However, the size and complexity of an audit engagement may result in various combinations of these employees. For example, on a large, complex engagement of a publicly-held company, there will be a second or concurrent partner who independently reviews the audit. There is also likely to be more than one manager and senior involved in the engagement. At the other extreme, a small audit engagement may only involve a partner and an experienced senior.

contains competent, sufficient evidence that supports the audit team's judgments and conclusions; and that the work is properly documented in the working papers. By reviewing the working papers with these issues in mind, the reviewer attempts to minimize exposure to risks from lawsuits by users of financial statements. Additionally, the review of working papers during the engagement also monitors audit costs by ensuring that the work is completed on a timely basis and reasons for cost overruns are identified.

The overall goal of the review process is to reduce the risk of failing to detect material misstatements to an acceptable level. Numerous factors may impact the effectiveness of the review process in achieving this objective. This study focuses on three factors that may affect the review process and its objective of minimizing the risk of failing to detect material misstatements: (1) the experience of the reviewer, (2) the industry specialization of the reviewer, and (3) the processing mode (individual versus team).

Statement of the Problem

Even though the review process plays an important role in the conduct of an audit, and auditing standards articulate the importance of more experienced auditors reviewing the work of subordinates, little is known about the ability of the review process to reduce the risk of material misstatement (Rich et al. 1997). Three questions remain unanswered based on a review of the empirical studies of the audit review process: (1) Does the review process reduce the risk of failing to detect material misstatement in an effective manner? (2) At what level in the review process is risk reduced the most? and (3) Does

general experience, industry specialization, or the processing mode individually or collectively affect the amount or the manner of risk reduction in the review process?

The first question is important because there is little or no empirical evidence that the review process is effective in reducing the risk of material misstatements.⁴ However, we do know that auditors are motivated to reduce the risk of material misstatements in audited financial statements because (1) auditors are subject to legal liability from clients and users, and to sanctions from the SEC and AICPA, (2) auditors want to maintain their reputation, and (3) clients can change auditors. Thus, auditors have incentives to effectively conduct the review process in order to reduce the risk of failing to detect material misstatement. The second and third questions are important because isolating the factors that can increase the effectiveness of the review process may assist public accounting firms in identifying ways to “re-engineer” the review process. This may be especially important to public accounting firms given today’s complex and changing audit environment (Elliott 1994).

Additionally, public accounting firms may be able to provide specialized knowledge to lower level audit staff who then can use the acquired skills to perform tasks more effectively and to complete audit tasks within budgeted time. Effective task performance by such auditors may mean that the audit firm can minimize their exposure to legal liability since skilled auditors should be more proficient at audit tasks and hence more effective at detecting material misstatements. Such knowledge transfers also have

⁴ An exception is Johnson and Jamal (1988).

implications for audit efficiency. If lower level auditors are more effective at detailed audit work, higher level auditors will need less time to review subordinate's work and, therefore, have more time to resolve other, more complex audit issues.

Audit researchers should also be interested in factors that affect team decision making. The focus of much prior behavioral research has been on individual judgments,⁵ yet it is known that much of the information processing on an audit involves team activities (Solomon 1987; Bamber, Bamber, and Bylinski 1988). Examining factors such as experience, industry specialization, and processing mode can improve our knowledge of team or group decision making.⁶ While some research effort has examined the effect of these factors on individual judgment; their effect on group judgment⁷ has not received much attention (Solomon 1987; Rich et al. 1997; Libby and Luft 1993).

The remainder of this paper is organized as follows. Chapter 2 presents a model of the review process and develops the hypotheses. Chapter 3 discusses the research methodology including experimental subjects, task description and its administration, and experimental design. Chapter 4 presents the results. Finally, Chapter 5 summarizes the relevant contributions and discusses the limitations of the study.

⁵ The work of Solomon, Trotman and their colleagues are exceptions.

⁶ Not examined in this study are issues such as job satisfaction, motivation, incentives, team rapport, leadership behavior, management styles, and organization structure that may be relevant to team or group processing in auditing context.

⁷ Group judgment here refers to the effect of such factors on the hierarchical processing of information by the audit team (Solomon 1987).

CHAPTER 2

MODEL DEVELOPMENT AND RESEARCH HYPOTHESES

Research has primarily described the review process as an audit quality control mechanism. Rich et al. (1997), Roebuck and Trotman (1992), Solomon (1987), Trotman and Yelton (1985), and Trotman (1985) examined the quality control properties of the review process and the value of reviewed judgments on audit decision making. They concluded, in general terms, that a review of audit work provides a base for quality control of audit judgments. Rich et al. (1997) separate the review process into stages and identify different cognitive processes that take place at each stage. They note that (1) the review process should allow the reviewer to be sensitive to the inputs and processes existing in the review environment, (2) the review process is composed of a multi-person environment with strategic players, and (3) the cognitive processes that take place during performance of the review are essential to the effectiveness of the reviewer. Further, Rich et al. (1997) note that future research should provide insights into the source of differential processing on the effectiveness of the reviewer or the review process.

Model of the Review Process

A model of the review process is presented in figure 2-1. The review process is characterized as an iterative and sequential feedback process where evidence is gathered and evaluated by a subordinate and then reviewed by the next superior in the hierarchy. The model begins with the preparation of the audit plan for a client by the audit partner

and manager (node 1). A team of auditors conducts the audit (node 2) with each team member performing relevant audit procedures in specific audit areas. The completed work is documented in working papers including the judgments and conclusions made by the subordinates. The work performed by a subordinate constitutes input into the next higher level's review activities. For example, suppose a staff auditor was assigned to test a sample of payroll checks. The staff auditor can compare the hours used to calculate gross pay to the employees' time cards and the pay rate to the employees' payroll records. Deductions for taxes and other withholdings can also be compared to information in the payroll records. The staff auditor would document the results of each test and reach a conclusion. The working papers would then be submitted to the senior for a review.

The senior reviews the work performed by the staff auditor (node 3) to ascertain whether the audit work is adequate (i.e., is in compliance with GAAS and firm policies, and meets the guidelines set forth in the audit plan). This is symbolized by an arrow leading from node 3 to the decision box at node 4. If the senior finds that the staff's audit work is adequate, the senior accepts the work and concludes that sufficient competent evidence has been gathered and the path leads from node 4 to node 9. The evidence is held at node 9 in anticipation of a further review, if necessary,⁸ by the audit manager.

If the senior decides that the audit work is not adequate, additional audit work is required and the decision path leads to node 5. The senior issues review notes to point

⁸ It should be noted that some public accounting firms follow a process where low risk audit areas are only subjected to one level of review.

out the deficiencies (errors) detected in the staff auditor's work.⁹ The review notes may include instructions to correct cosmetic errors in the working papers, to re-perform an audit procedure, or to perform additional audit work.

The staff auditor completes the steps listed in the review notes (node 6) and resubmits the completed work to the reviewer for a second review (node 7). The senior again reviews the work to determine whether it is adequate (node 8). If the work is adequate, the path leads to node 9. If the auditor's work is not adequate (node 8), the reviewer issues additional review notes and the process returns to node 5. The iteration continues through nodes 5, 6, 7, and 8 until the reviewer accepts the work of the subordinate as adequate.

When all the evidence and other supporting document have been reviewed by the superior members of the team (node 10), the audit partner issues the audit report on the financial statements (node 11). In this model, node 9 constitutes the end of a review cycle by a team of two auditors (e.g. a senior and the staff) and the commencement of each subsequent review cycle by another team of two auditors (e.g. a manager and the senior). The box formed by the broken lines in the model is defined as the "quality control mechanism" of the review process. The box formed by the solid line is defined as the "risk reduction process" and is the focus of this study.

⁹ Review notes are written by the reviewer to document the inadequacies in the subordinate's work or to make suggestions for improving documentation. "To do" notes must be "cleared" by the preparer before the opinion is issued (Roebuck and Trotman 1992). Some audit firms no longer use review notes. They conduct the review of the working papers through interviews with the subordinate. The subordinate follows up the issues raised during the interview and reports the results to the superior.

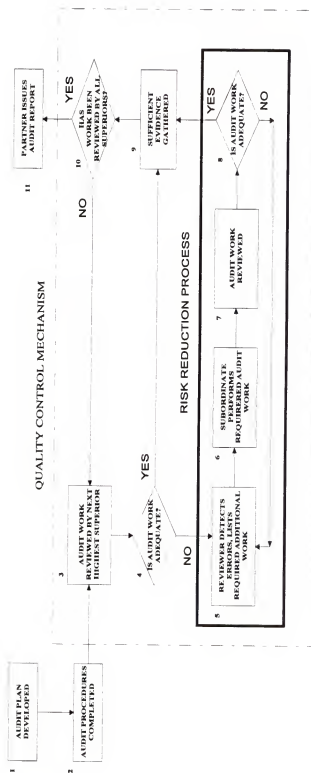


FIGURE 2-1 A MODEL OF THE REVIEW PROCESS

Risk Reduction in the Review Process.

Although existing studies have primarily focused on the review process' quality control issues (see box with broken lines in figure 2-1), the ability of the review process to reduce risks (misstatements) has not been examined. The review process should lead to a reduction of risk in two different ways: (1) the risk of failing to detect material misstatements in a set of audited financial statements and (2) the reviewer's perceived risk of material misstatements in the audit work completed by a subordinate.

The Risk of Failing to Detect Material Misstatement

Audit risk is the risk that the auditor may unknowingly fail to appropriately modify an audit opinion on financial statements that are materially misstated (AICPA 1996, AU312.02). Audit risk includes both uncertainties due to sampling and uncertainties due to factors other than sampling (referred to as non-sampling risk). Sampling risk arises from the possibility that when an audit is restricted to a sample, the auditor's conclusions may be different from the conclusions he or she would reach if the test were applied in the same way to all the items in the account balance or class of transactions (AICPA 1996, AU 350.11). Sampling risk varies with the size of the sample: the larger the sample, the smaller the sampling risk. Sampling risk is not considered in this study.

Non-sampling risk includes all aspects of audit risk that are not due to sampling (AICPA 1996, AU 350.11). Non-sampling risk includes (1) selecting audit procedures that are not appropriate or efficient for a particular test and (2) failing to detect material misstatements included in the items tested. Non-sampling risk can be reduced through

adequate planning and supervision (including the review of working papers) and effective hiring, training, and promotion policies.

The First Standard of Field Work (AICPA 1996, AU 310.01) states that the "work is to be adequately planned, and assistants, if any, are to be properly supervised." If the audit work is not properly planned and supervised, there is an increased risk that material misstatements will not be detected. Further, inadequate planning may lead to unnecessary time pressure on subordinates and to assigning auditors to less familiar tasks.

An effective hiring, training, and promotion policy can greatly reduce non-sampling risk since audit personnel with specific knowledge of the relevant tasks will be assigned to conduct the audit. The lack of specific knowledge can increase non-sampling risk because subordinates or reviewers may fail to (1) understand what to look for in a given task, (2) be aware of the implications of detected misstatements, and (3) choose appropriate audit procedures for detecting material misstatements. More specifically, lack of specific knowledge due to faulty personnel policies may cause subordinates and reviewers to (1) commit oversight errors, (2) incorrectly project and isolate errors (Burgstahler and Jiambalvo 1986), (3) wrongly integrate subordinates' judgment errors (Moeckel and Plumlee, 1989), and (4) commit conjunctive fallacies because they lack thorough knowledge or an understanding of the task or the industry.

Reviewer's Perception of Risk

The reviewer's perceived likelihood of risk involves the reviewer's subjective *belief* about the presence or absence of misstatements in a subordinate's work prior to conducting a review. This risk can be defined as a reviewer's pre-review expectation of

misstatements likely to be present in a subordinate's work. This expectation of errors may be based on factors such as (1) the nature of the task (2) the reviewer's level of knowledge and familiarity with the task, (3) the reviewer's ability to accurately assess the quality of the work done, and (4) the reviewer's reliance on the subordinate's ability, expertise, or specialized knowledge. For example, a reviewer working outside of his or her specialization might not have the relevant knowledge of the client's industry and therefore may perceive that the work done by a subordinate who has more industry knowledge and experience does not contain misstatements. Alternatively, because the reviewer lacks the knowledge and understanding of the client's industry to properly review the work, he/she might perceive a greater risk in the subordinate's work; not because of the subordinate but because he or she does not have the requisite knowledge.

A reviewer might also be affected by the perceived reliability of a subordinate whose work he or she is being asked to review. This might affect how the reviewer perceives the risk of misstatements in the work prepared by the subordinate. For example, Bamber (1983) noted that audit managers discounted the work of audit seniors who were perceived to be less reliable. Lastly, the nature of the task performed may also affect the reviewer's perceived likelihood of risk. If the task is complex, the reviewer may believe that the subordinate will be less effective at detecting material misstatements than when the task is routine or general.¹⁰

¹⁰ Task complexity is not tested in this research.

Location of Risk and Risk Type in the Model of the Review Process

The risk of failing to detect material misstatement and reviewer's perception of risk may jointly occur during the review process. However, the two types of risk occur at different points in the model of the review process shown in figure 2-1. The risk of failing to detect material misstatements enters the model when the audit plan¹¹ is prepared in node 1 and the reviewer's perception of risk enters the model when the reviewer reviews (node 3) or re-reviews the completed audit work (node 7).

At node 1, the auditor determines the level of planned detection risk (PDR) based on the planned level of audit risk (AR), and an assessment of inherent risk (IR) and control risk (CR). PDR is achieved by testing audit objectives through the use of audit procedures. For each procedure completed, the auditor achieves a certain level of detection risk (ADR). If the audit is planned properly, ADR should be equal or less than PDR. Thus, each additional piece of evidence gathered is aimed at reducing the ADR to PDR. The review of a subordinate's work by a superior attempts to ensure that ADR is at least equal to PDR. In the model, node 4 is where the reviewer examines the adequacy of the evidence gathered by the subordinate. For example, an audit senior may detect inadequate work during the review of a subordinate's work. The senior lists the deficiencies and instructs the staff auditor to perform additional work. The staff auditor performs the additional work requested by the senior. This process continues until the

¹¹ It should also be noted that part of the problem at the planning stage is not just the design of the audit procedures. It can also be caused by assigning the wrong (not just industry qualified) people to the audit. This problem, if it exists, increases the risk of material misstatements prior to review of the work.

senior assesses ADR to be equal to or less than PDR. The systematic reduction of ADR through the review process suggests that audit risk is being reduced to an acceptable level since the reduction of ADR is equivalent to a direct reduction in AR when both inherent risk and control risk are held constant.

The second risk, the reviewer's perception of risk, enters the model at node 3 and node 7 when the reviewer attempts to review or re-review the work prepared by the subordinate. Initially, the reviewer has some belief about the presence of material misstatement or work paper deficiencies in the audit work of the subordinate. At the end of the review process, the reviewer's confidence that material misstatements remain in the financial statements or work papers is reduced to an acceptable level.¹²

An important question that arises from the preceding discussions is "what factors lead to effective risk reduction and how do these factors interact to reduce risk in the audit review process?" This study posits that risk reduction is affected by three factors: (1) the level of auditor in the team hierarchy (manager versus senior), (2) industry specialization, and (3) processing mode (individual versus team). Thus, risk reduction (RR) can be stated as

$$RR = f(\text{Review hierarchy, Specialization, and Processing mode}) \quad (1)$$

In this study, risk reduction is defined as any critical misstatement or consequential omission in the client's financial statements or in the audit working

¹² There is no guarantee that one reviewer's assurance of no misstatements translates to the same level of assurance by subsequent reviewers, since lower level reviewers or auditors with limited industry knowledge can be wrong in their perception of risk.

papers¹³ prepared by a subordinate that are detected by another auditor (usually a higher hierarchy auditor) who is reviewing the financial statements or the working papers.

Failure to detect such misstatements is likely to have potential financial ramifications for the CPA firm. Perceived risk reduction is defined as the change in a reviewer's perception of the risk of material misstatements in a subordinate's work.

Factors Affecting Risk Reduction in the Review Process

The ability of the auditor to effectively perform an audit task such as work paper review depends on a number of factors. The impact of each factor upon each audit team member is not likely to be the same. The empirical literature in auditing provides some evidence on the effect of experience, industry specialization, and processing mode on auditors' decision making and task performance.

General Audit Experience: Returns¹⁴ to Review Hierarchy

Auditors acquire a basic level of accounting and auditing knowledge, including generally accepted accounting principles, generally accepted auditing standards, and the flow of transactions through the accounting systems (Bonner and Lewis 1990). This basic audit knowledge is normally acquired early in an auditor's career and such knowledge is necessary to effectively conduct an audit. Traditionally, general audit

¹³ This definition does not include "technical errors." Technical errors are working paper presentation or format errors that only affect the appearance of the working papers and not the risk of failing to detect material misstatements.

¹⁴ "Returns" as used in this study refers to added benefit or value from experience or industry specialization, and not an economic return.

experience has been defined as number of years worked as an auditor or level within a public accounting firm.

Prior research at the individual auditor level supports the expectation that more experienced auditors have more general audit experience and, therefore, should be able to identify more misstatements than less experienced auditors. For example, it has been shown that experienced auditors recalled more internal control errors than students (Weber 1980; Frederick 1991), that experienced auditors generated more correct financial statement errors than less experienced auditors (Frederick and Libby 1986), and that experienced auditors make better judgments about the frequency of financial statement errors than students (Butt 1988). Other studies have shown that more experienced auditors can generate better and more plausible hypotheses (Libby 1985, Libby et al. 1987), recognize pertinent evidence (Libby et al. 1987), recall more errors (Tubbs 1992), and better weight and combine cues (Heiman 1990) than less experienced auditors. Additionally, Frederick (1991) concluded that experienced auditors are better able to associate their knowledge of likely errors with the relationship of errors in internal control.

In an audit team, more experienced auditors occupy higher positions in the team hierarchy.¹⁵ The model of the review process shown in Figure 2-1, indicates that higher level team members review the work product of subordinates (i.e., the senior reviews the staff's work, the manager reviews the senior's work, and finally the partner reviews the

¹⁵ Concurrent partner review is an exception. Concurrent partners or may not have the same experience level as the engagement partner.

manager's work). Thus, reviewers at each higher level should be better be able to identify misstatements than subordinates because they have more general audit experience.

Further, the review process is sequential and iterative (see risk reduction box in Figure 2-1); this is intended to ensure that material misstatements not detected by a reviewer at lower level should be detected by a reviewer at a higher level.

From the preceding discussion, we know that one reason more misstatements are detected in the review process is that reviewers possess more general audit experience than auditors below them in the team hierarchy. Thus, when an auditor at a higher level in the hierarchy applies acquired audit experience to review the work of a subordinate, the review should result in some incremental benefit because previously undetected material misstatements may be detected by more experienced auditor during the review. I refer to this benefit as "returns to review hierarchy." It involves using the general audit experience that exists in the higher levels of the audit team hierarchy to detect additional misstatements. In this regard, review hierarchy constitutes a necessary condition for incremental error detection or risk reduction in the review process.

However, reviewers may not consistently and uniformly detect material misstatements *better* than subordinates in all tasks. This is because audit tasks vary with respect to their complexity. Some tasks are *mechanical* and require no subjective judgments while others are *conceptual* and require significant judgments. Therefore, the potential for incremental error detection during the review of a subordinate's work may be dependent upon whether the errors detected are mechanical or conceptual.

Mechanical errors occur in routine audit tasks, i.e., tasks requiring no subjective judgment to perform and they may be easier to detect by most auditors. For example, Ashton and Kramer (1980) showed that both college students and experienced auditors were equally successful when assessing control risks.

Further, mechanical errors are likely to be identified first by lower level auditors (staff and seniors) because they perform the most basic and detailed audit work. Thus, lower level auditors may be more efficient or effective at detecting mechanical errors than higher level auditors, because they initially perform tasks that are likely to contain more mechanical misstatements. Higher level auditors only review the completed work of the subordinate and they may or may not encounter *mechanical* errors as often as lower level auditors. The nature of their focus may also cause higher level reviewers to focus on conceptual errors.

Conceptual errors,¹⁶ on the other hand, occur in more judgment-oriented tasks. Thus, conceptual errors may be more difficult to detect, particularly by auditors who do not possess more complete general audit experience and by auditors who normally complete routine tasks. Conceptual errors are likely to be encountered because auditors focus on the riskiness of an account, and because more complex or technical events affecting the audit are likely to arise later in the audit process. These events may require further investigation by the auditor and are likely to be resolved at higher levels of the team hierarchy. Therefore, as the level of the review hierarchy increases, more

¹⁶ The conceptuality of errors in this study was determined by having external industry experts rate the seeded errors.

conceptual or judgmental misstatements would be detected at a higher level than the previous lower level of the team hierarchy. This phenomenon also arises because lower level auditors may have detected, the easy (*mechanical*) errors early in the task and only the harder (*conceptual*) errors are detected later in the audit during work paper review.

Based upon the above analysis, the following hypothesis is tested.

- H1: Lower hierarchy auditors will detect more mechanical misstatements than high level reviewers while reviewers will detect more conceptual misstatements than lower level auditors.

Specialized Knowledge: Returns to Specialization

Although the evidence shows that general audit experience as an important factor in most audit judgment tasks, some tasks require specialized audit experience or knowledge to complete properly. Specialized audit experience is different from general audit experience. While general audit experience may be acquired because the auditor had basic knowledge of the audit process, specialized experience or knowledge arises because an auditor has received audit training and direct experience in a specialized industry and/or with a specific task. This specialized experience may be acquired at different times during the auditor's tenure with the CPA firm.

Auditors develop domain specific knowledge (Bonner and Lewis 1990) and task specific knowledge¹⁷ (Bonner 1990) to solve auditing problems. While there are many facets of specialized knowledge, this study focuses on specialized industry knowledge.

¹⁷ Auditors or accountants may possess different kinds of domain knowledge since they can specialize in *either* a service or functional area such as taxation, auditing, or management advisory services, or by type of industry, task, or client (Stone 1968). Such knowledge must then be mapped to a specific task for successful completion of the task.

This knowledge is different from task specific knowledge.¹⁸ Specialized industry knowledge applies to the knowledge necessary to solve a task in a specialized industry. When individuals use specialized knowledge to perform tasks in specialized industries,¹⁹ I refer to it as specialized industry knowledge. In this study, specialized industry knowledge is defined as the acquisition of specific, specialized, or emerging knowledge, including rules and their applications in a domain area beyond general audit experience. Specialized industry knowledge may be acquired from direct or indirect training in a specific industry or through experience working in the specialized industry.

Empirical evidence supports the expectation that auditors who acquire training and/or task-specific experiences in specialized areas are likely to exhibit superior performance in those specific areas. For example, Bedard and Biggs (1991) report that auditors who specialized in auditing certain kinds of inventory were more successful at proposing appropriate audit procedures for known errors in the inventory task than auditors who did not possess such specialized knowledge. Johnson and Jamal (1988) also report that an inexperienced²⁰ but highly specialized concurrent partner with a health care

¹⁸ Task specific knowledge relates only to specific task, such as auditing accounts receivable. Thus auditing accounts receivable in a typical wholesale or manufacturing company would require the same knowledge. However, auditing accounts receivable in the banking industry requires industry specific knowledge in addition to task specific knowledge.

¹⁹ Some accounting firms have organized their practice along industry specializations including their training programs and reward structure (cf. Emerson 1993, Solomon et al. 1996).

²⁰ The inexperienced concurrent partner had only one year experience as a partner compared to the experienced concurrent partner who had ten years experience as a partner.

industry specialization was more successful at detecting a material misstatement in a health care client than a highly experienced unspecialized concurrent partner. Taylor (1996) also finds that specialized auditors were more effective and efficient than unspecialized auditors at assessing risk and justifying assessed risk in a bank loan portfolio.

Although the evidence suggests that specialized knowledge assists individual auditors in performing tasks more effectively, specialized knowledge must be mapped to specific tasks in order for it to be meaningful. For example, third party billing in the health care industry requires different specialized knowledge than assessing the allowance for loan losses in the banking industry. Therefore, auditors who specialize in health care tasks cannot be expected to uniformly perform as well or better (detect more misstatements) than auditors who specialized in banking when the task is in banking. However, if the task is in health care, auditors who specialize in the health care industry can be expected to do better in their specialization than specialists in banking. The specific benefits of specialization is what I referred to as “returns to specialization,” because in general, specialized industry knowledge will facilitate auditors’ ability to better detect financial statements misstatements and deficiencies in a subordinate’s work while working in their specialization. Based on the analysis presented above, the following hypothesis is proposed to test the effect of specialized knowledge on risk reduction.

- H2: Auditors will detect more misstatements working in their specialization than when working outside of their specialization.

Processing Mode (Individual Versus The Review Team)

From the proceeding discussion, two general principles seem to follow: (a) more experienced auditors do better than less experienced auditors when working individually, and (b) specialized auditors do better than non specialized auditors when working individually. However, this does not consider the effect of hierarchy in the audit team or the nature of the review process.

Hill (1982) and Solomon (1987) surveyed the literature on individual versus team processing. Their surveys indicate a general consensus that a group of individuals working together generally outperforms individuals working alone. They also indicated that, in some cases, the superior performance of teams over individual is context specific. For example, when there is an overlap of knowledge, the group may not outperform the most knowledgeable member of the team.

In auditing, interacting groups of individuals have been shown to make better judgments than individual auditors (Trotman et al.1983), and audit teams' consensus judgments have been shown to increase with the review process (Trotman and Yelton 1985). These findings have implication for risk reduction in the review process, that is, processing mode (individual versus team processing) may affect the manner in which misstatements are detected and it may also affect the nature, type, and amount of misstatements detected. For example, the senior may detect more misstatements than the staff, and the manager may detect more misstatements than the senior. However, the senior and manager working in a review team may detect a larger number of misstatements than either the manager or the senior working alone. Such risk reduction

arises because the review team's output is a cumulative product of all the team members, with each team member using his or her skills and knowledge to formulate the team's output. Thus, the diversity of the members in a review team creates a synergy which may allow the review process team to be more effective at solving more difficult tasks than individuals. Based on this analysis, the review process should result in an incremental benefit due to processing mode. This leads to the following hypotheses.

- H3: Risk reduction will be greater for auditors working in review teams than for auditors working individually (managers or seniors).

The Interaction of Hierarchy, Specialization, and Processing Mode

The auditing environment potentially creates interactions among the factors that affect risk reduction and the review process. The most interesting interaction pertains to how risk reduction due to the review hierarchy differs as a function of industry specialization and processing mode. The nature of the expected interactions is examined next.

When tasks require specialized industry knowledge, it is anticipated that risk reduction will be sensitive to the joint effect of review hierarchy, specialization, and processing mode. Thus, it is expected that as the level of review hierarchy increases, specialized review teams working in their specialization should detect more misstatements than specialized auditors working individually in their specialization. Similarly, as the level of hierarchy increases, specialized review teams working out of their specialization should detect more misstatements than specialized auditors working

individually out of their specialization. This expectation demonstrates the superiority of teams or groups versus individuals working *either* in and out of specialization.

Further, as review hierarchy increases, specialist auditors working in their industry of specialization should detect more misstatements than when working outside their specialization. This expectation demonstrates the potential benefits of specialized knowledge because auditors working out of their specialization are likely to lack the specialized knowledge required to efficiently perform a task in other specializations. Based on the discussion presented above the following hypotheses are proposed:

H4(a) As the level of hierarchy increases, review teams working in their specialization will detect more misstatements than auditors working individually in their specialization.

H4(b): As hierarchy level increases, review teams working outside of their specialization will detect more misstatements than auditors working individually out of their specialization

Effect Of Perceived Risk

A reviewer's perception about the likelihood of misstatements in the work to be reviewed is based on the level of uncertainty held by the reviewer concerning the work prepared by a subordinate. This uncertainty changes depending on (1) nature of the task (2) the reviewer's knowledge of the task or industry, (3) the reviewer's ability to accurately assess the quality of work done, and (4) the reliability placed upon the subordinate who previously performed the work. This study posits that the reviewer's perceived risk of misstatements in financial statements or work papers will be smaller after the review than before the review. However the magnitude of the reduction will depend upon the factors discussed above. In general, auditors will rate pre-review risk

higher than post review risk, regardless of the specific specialization of the auditor. This arises because non specialized auditors may rely on the subordinate's work and they may rate pre review risk lower if they do not individually find any errors. If they find errors in a task in which they are not specialized, they will likely rate post review risk higher than pre-review risk. In contrast, auditors with the requisite industry knowledge will rate the pre-review risk lower since they were told to rate this risk while assuming that the errors they found have been corrected. These issues lead to the following hypothesis.

- H5: Reviewers' perceived risk of material misstatement will be smaller after the review of a subordinate's work than before the review.

Chapter 3 will present the experimental methodology used to test the hypotheses.

CHAPTER 3 METHODOLOGY

A laboratory experiment was conducted to test the research hypotheses developed in Chapter 2. The experiment involves administering a set of two cases to differentially experienced auditors from two industries. One case examined accounts receivable and related accounts in the health care industry and the other case examined loans receivable and loan loss reserves in the banking industry. The two industries were chosen because they are specialized industries with their own peculiar and unique services and products, accounting rules, and regulatory requirements. In addition, a group of audit partners who specialized in one of the two industries independently rated the set of errors that were seeded in the cases. These ratings were used to classify the misstatements as mechanical or conceptual. The remainder of the chapter describes, (1) the experimental design, (2) the case materials, (3) the subjects (4) the procedure and administration of the cases (5) the rating task, and (6) the dependent variables.

Experimental Design

The experiment investigated the effect of review hierarchy, industry specialization, and processing mode on the ability of the review process to reduce the risk of material misstatements. However, for the purpose of the analysis, the design (figure 3-1) manipulates the following operational factors: review hierarchy (LEVEL), industry specialization (INDUSTRY), processing mode (PROCMode), and task pair

TASKPAIR)²¹ in a 2x2x2x2 repeated factorial design where the repeated factors are review hierarchy (senior and manager) and processing mode (individual or team). The between-subject factors are industry specialization (in or out of specialization), and task pair while the within-subject factors are processing mode and review hierarchy. Review hierarchy is crossed with specialization, task pair, and processing mode. Similarly, specialization is crossed with processing mode and taskpair. When a factor is crossed with another, the factor is exposed to every level of the other factor. Review hierarchy, specialization, taskpair, and processing mode are fixed effects factors. The constructed review process teams are the random units of experiment.

Description of Factors

Review hierarchy was manipulated by including audit managers and audit senior as subjects. Audit seniors performed a first review on a subordinate's health care *and* banking work papers. Thus, the senior performed the same task in two different industries. Managers on the other hand, performed a first review on one set of work papers prepared by the staff (i.e, the same task as the senior) and performed a review on a set of work papers that had been reviewed by an audit senior. Industry specialization was manipulated as "in-specialization" and "out of specialization." In-specialization (out of specialization) means that an auditor is reviewing work papers in (out of) his or her specialized industry.

²¹ Taskpair is the pairing of task with processing mode and it has two levels: (1) the pairing of "individual" work in their specialization and "team" work out of their specialization and (2) the pairing of "individual" work out of their specialization and "team" in their specialization.

Figure 3-1
Experimental Design
Panel A Health Care Industry Specialized Teams

	Working Individually		Working as Team	
	Manager	Senior	Manager	Senior
Teams 1-18	Hospital Case by In specialization		Banking Case by Out of Specialization	
Individual In Spec.				
Team Out of Spec.				
	Working Individually		Working as Team	
	Manager	Senior	Manager	Senior
Teams 19-36	Banking Case by Out of Specialization		Hospital Case by In Specialization	
Individual Out of Spec.				
Team In Spec.				

Panel B Banking Industry Specialized Teams

	Working Individually		Working as Team	
	Manager	Senior	Manager	Senior
Teams 37- 54	Banking Case by In Specialization		Hospital Case by Out of Specialization	
Individual In Spec.				
Team Out of Spec.				
	Working Individually		Working as Team	
	Manager	Senior	Manager	Senior
Teams 55-72	Hospital Case by Out of Specialization		Banking Case by In Specialization	
Individual Out of Spec.				
Team In Spec.				

To illustrate, a healthcare (banking) senior is working “in-specialization” reviewing work papers prepared by a healthcare (banking) staff and is working “out of specialization” when reviewing work papers prepared by a banking (health care) staff.

Processing mode was manipulated as individual and team processing. Auditors worked on one case individually and on a second case as a part of a review team.²² The work done individually by either seniors or managers was not reviewed. The work done by a senior as part of a review team was reviewed by the manager in the team. At the onset, the auditors were aware through general and specific instructions²³ that their work may be reviewed by a higher member of their team.

Taskpair was manipulated as the interaction of processing mode with *in* versus *out* of specialization. This was accomplished by having each subject solve a pair of cases in (out of) their specialization; one individually and the other as a part of a team. The two industry teams were divided into two halves.²⁴ The first half solved a pair of cases in one order and the second half solved the cases in a reverse order. In the first order each auditor first solved one case in (out of) their specialization individually before solving the second case out of (in) their specialization as part of a review team. In the second order,

²² The term “individually” or “as review team” implies the following: Solving the case individually means that work papers were reviewed initially by the senior *or* manager, and solving the case as a part of a review team means that work papers reviewed by a senior were also reviewed by the next higher level auditor.

²³ The same instructions were given to the seniors in the team and individual condition, however the researcher designated for review, the work of seniors in the “team” condition

²⁴ Each industry team was divided into two halves for each order of taskpair.

each auditor first solved one case out of (in) their specialization individually before solving the second case in (out of) their specialization as part of a review team. Thus, there were two levels of order and four versions of the case material included in the design.

Mitigating Confounding of Industry Specialization with Case

The design described above and presented in figure 3-1 attempts to mitigate potential confounding of industry specialization with case or task. To illustrate this effect, panel A or panel B alone involved one specific set of specialized industry teams solving both a health care and banking case. If the design implemented in this study included only panel A or panel B, we could analyze the data for the effects of industry specialization and review hierarchy on risk reduction. This would involve comparing risk reduction returns in the health care case versus banking case for individual versus team conditions for *either* the health care or banking teams. The health care (banking) teams might perform better in the health care (banking) case than in the banking (health care) case. When this occurs, one might argue that the health care (banking) case was easier than the banking (health care) case. Consequently, the comparison of “in-specialization” versus “out of specialization” would be confounded with case and this would not provide reliable information since it would be difficult to attribute the effects obtained to be due strictly to *either* industry specialization or case.

The design used in this study mitigates the potential confounding of specialization with case by replicating panel A in panel B for the banking industry teams using a counter balancing strategy. This strategy allowed the health care (banking) teams to

perform a hospital case and a banking case individually and also perform a banking case and a hospital case as a part of a review team. The work performed by the senior as part of a team would be reviewed by the manager of their respective review teams. Because the auditors in the two industries are performing the two cases in either industry, if the health care case was an easier case than the banking case, it should equally be easier for the health care teams in panel A and for the banking teams in Panel B. If this situation occurs, the confound of specialization with case, if any, would be mitigated since both specialized industry teams completed the two cases in all the possible orders. One general advantage from counter balancing is that it guaranteed that treatments would be orthogonal to position or order effects and problems due to multicollinearity would be minimal.

In addition to the design presented in Figure 3-1, which outlined the order in which the individuals or teams performed the cases, Figure 3-2 presents the procedural representation of the order and case versions which were presented to the subjects. As shown in Figure 3-2, half of the teams in each order were presented different versions of the case materials. This was done to mitigate version effect (see below). For example, teams 1- 18 in panel A of Figure 3-2 performed the cases in the first order in which the subjects first performed the cases (in or out of their specialization) individually before performing the cases (in or out of their specialization) as part a team. However, within this order, teams 1- 9 received one version of the cases and teams 10-18 received another version of the case. In the second order, teams 19 -36 in panel A first performed the cases as part of a team before performing the case individually, however, within this

order, teams 19-27 received one version of the cases and teams 19-27 received another version of the case. This version arrangement produced the following: health care team 1 through 9 solved the health care case first, which is in their specialization before they solved the banking case, which is out of their specialization. Health care team 10 through 18 solved the banking case, which is outside their specialization before solving the hospital care case, which is in their specialization. Teams 19 through 27 solved the banking case, which is out of their specialization before they solved the hospital case, which is in their specialization. Health care team 28 through 36 solved the hospital case, which is in their specialization before they solved the banking case, which is out of their specialization. Identical order and versions were used for the banking teams.²⁵

The counterbalancing methodology necessitated the need for a respective contrast coding design presented in Figure 3-3 and described in Figure 3-4 below. The contrast coded design was used in analyzing the results discussed in chapter 4.

Cases Materials

Two experimental work paper cases were presented to the subjects (see Appendix A). The cases were designed to measure (1) the ability of the audit review process to reduce the risk of material misstatements in an effective and efficient manner, (2) the role of general audit experience in reducing risk during the audit review process, and (3) the role of specialized industry knowledge in reducing the risk of material misstatements.

²⁵ Only the health care teams are shown in Figure 3-2

Figure 3-2
Sequence of Task Performance and Related Version
Healthcare Specialist Teams Only*

Panel A

Order 1 (Individual /Team)

LEVEL	INDIVIDUAL	TEAM
SENIOR <i>Phase 1 (ver 1)</i> Teams 1-9	Healthcare senior reviews healthcare staff work papers. <i>booklet 1</i>	Healthcare senior reviews banking staff work papers. <i>booklet 2</i>
MANAGER <i>Phase 2 (Ver 1)</i> Teams 1-9	Healthcare manager reviews healthcare staff work papers. <i>booklet 1</i>	Healthcare manager reviews healthcare senior's review of banking staff work papers. <i>booklet 2</i>
SENIOR <i>Phase 1 (Ver 2)</i> Teams 10-18	Healthcare senior reviews banking staff work papers. <i>booklet 1</i>	Healthcare senior reviews healthcare staff work papers. <i>booklet 2</i>
MANAGER <i>Phase 2 (Ver2)</i> Teams 10-18	Healthcare manager reviews banking staff work papers. <i>booklet 1</i>	Healthcare manager reviews healthcare senior's review of healthcare staff work papers <i>booklet 2</i>

PANEL B

Order 2. (Team/Individual)

LEVEL	TEAM	INDIVIDUAL
SENIOR <i>Phase 1 (Ver 3)</i> Teams 19-27	Healthcare senior reviews healthcare staff work papers <i>booklet 1</i> <hr/> IN <hr/>	Healthcare senior reviews banking staff work papers. <i>booklet 2</i> <hr/> OUT <hr/>
MANAGER <i>Phase 2 (Ver 3)</i> Teams 19-27	Healthcare manager reviews healthcare senior's review of healthcare staff work papers <i>booklet 1</i> <hr/> IN <hr/>	Healthcare manager reviews banking staff work papers. <i>booklet 2</i> <hr/> OUT <hr/>
SENIOR <i>Phase 1 (Ver4)</i> Teams 28-36	Healthcare senior reviews banking staff work papers. <i>booklet 1</i> <hr/> OUT <hr/>	Healthcare senior reviews healthcare staff work papers <i>booklet 2</i> <hr/> IN <hr/>
MANAGER <i>Phase 2 (Ver 4)</i> Teams 28-36	Healthcare manager reviews healthcare senior's review of banking staff work papers <i>booklet 1</i> <hr/> OUT <hr/>	Healthcare manager reviews healthcare staff work papers. <i>booklet 2</i> <hr/> IN <hr/>

Legend: "IN" means auditors perform tasks in- *their* specialization and "OUT" means auditors perform task out-of- *their* specialization.

Panel A and B were identical for the banking industry subjects.

Figure 3-3
Contrast Coded Experimental Design

Panel A

	a1 = Health Care Teams			
	C1 = Work individually		C2 = Work as Team	
b1=Individual in, Team Out	Cell 1	In = d1	Cell 2	Out = d2
b2=Individual out, Team In	Cell 3	Out = d2	Cell 4	In = d1

	a2 = Banking Teams			
	C1 = Work individually		C2 = Work as Team	
b1=Individual in, Team Out	Cell 5	In = d1	Cell 6	Out = d2
b2=Individual out, Team In	Cell 7	Out = d2	Cell 8	In = d1

Put differently,

	a1 = Health Care Teams			
	C1 = Work individually		C2 = Work as Team	
b1=Individual in, Team Out	Cell 1	HCCase=E1	Cell 2	BankCase=E2
b2=Individual out, Team In	Cell 3	BankCase=E2	Cell 4	HCCase=E1

	a2 = Banking Teams			
	C1 = Work individually		C2 = Work as Team	
b1=Individual in, Team Out	Cell 5	BankCase=E2	Cell 6	HCCase=E1
b2=Individual out, Team In	Cell 7	HCCase=E1	Cell 8	BankCase=E2

Between Factors	Description of Effects	Prediction
Industry (A)	Specialized Industry Team (A1= Health Care Versus A2=Banking)	NS
TaskPair (B)	Pairing of Task with Individual versus Team B1=Individual In Specialization, Team out of specialization B2= Individual Out of Specialization, Team in Specialization	S
Industry x Taskpair (AxB)	This is the Interaction of Specialized Industry teams and pairing of task with Individual and Team. From the contrast coding in Figure 3-3, it tests the interaction of In/out of Specialization x Individual versus. Team processing. It asks the question: Are the risk reduction returns to specialized knowledge different in Teams versus Individual?	S
Team/Industry, Taskpair	This interaction says, for each team we will compare the mean difference across teams for Health care and Banking.	
Within Factors		
Procmode (C)	Team Type (C1=Individual vs. C2= Team). The main effect should be significant	S
Level (D)	Level of Review Hierarchy (D1= Senior, D2= Manager)	
Procmode x Team /Industry, Taskpair (CxTeam/A, B)	This says that for each team, you will compare Individual Vs. Team mean difference to be the same across all teams or for homogeneity-an error term.	
Levelx Team/Industry, Taskpar (DxTeam /A,B)	Says that for each team, we compare each level of hierarchy- an error term	

Figure 3-4 Legend of Factors and their Expected Effects

Industry Procmode (AxC)	Specialized Industry team x Individual vs. Team. It asks the question: Is the advantage of working in teams different for people in Health Care vs Banking?	NS
Industry x Level (AxD)	Specialized Industry team x Level. It asks the question: Is the advantage of experience different for Health care Team Vs Banking Team?	NS
Industry x Procmode x Level (AxCxD)	Specialized Industry team x Individual Vs. Team x Review Hierarchy. This asks the question of whether the interaction is different for Health care teams Vs. Banking Team. That is, Is return to experience that differ in team vs Individual processing robust across Health care and Banking; does it exist?	NS
Taskpair x Procmode (BxC) (Test for In versus Out)	Pairing of Tasks with Individual/Team x Individual/Team <u>Diagonals</u> of this interaction are <u>In</u> specialization, <u>Off Diagonals</u> are out of Specialization. BxC tests "main effect" of In specialization Vs Out of Specialization. This should be Significant.	S
Taskpair x Level (BxD)	Pairing of Tasks with Individual/ Team x Review Hierarchy. Since contrast coding shows that main effect of B tests Interaction of Individual/ Team with In/Out of Specialization, this tests whether the interaction differs by the level of the Review Hierarchy. Conceptually, it is testing in/out of specialization x Individual / Team. It gets at whether the return to specialization in Individual versus in teams differs as a function of review hierarchy. It should be significant and if significant, follow up tests should include simple effect tests of In/Out of specialization x Review hierarchy in Individual and simple effects of In/Out x Review Hierarchy in Teams	S

Figure 3-4 Continued

Taskpair x Procmode x Level (BxCxD) -Simple effect test for In versus Out	(Notice that BxC= In/Out of Specialization) x (D=Review Hierarchy Pooling over Individual versus Team asks the question: Is the simple effect of Review Hierarchy different for teams working in specialization versus when working out of specialization? This may be significant because one might expect review hierarchy to help more as shown by the big difference between senior versus manager when out of specialization, because in specialization may catch more misstatements than out of specialization.	S
Industry x Taskpair x Procmode (AxBxC)	This interaction emanates from the contrast coding in Appendix A. You can see that it tests the effect of Health Care Versus Banking Case. You hope it is not significant, if it is not a major problem.	NS
Industry x Taskpair x Level (AxBxD)	This interaction asks the question: Does Taskpair x Level interaction differ for Health Care versus Banking?	NS
Industry x Taskpair x Procmode Ax Level (AxBxCxD)	AxBxC = Health Care versus Banking Case. Therefore, AxBxCxD asks the question of whether differences due to Review Hierarchy differ for the two cases.	NS

Figure 3-4 continued

Each case presented background information, a partial audit program, and work papers for either the audit of accounts receivables and related accounts of a hypothetical hospital or work papers for the audit of loans receivable and loan loss reserves of a hypothetical bank.

Case Development

In designing the case materials, I considered the importance of the account receivables and loan receivable subsystem of the two industries used in this study and the kind of errors that occur in the audit of these accounts. I consulted various auditing and related text books, academic, practice, industry-specific, and trade journals. In addition, I had discussions with members of the dissertation committee and a professor who teaches a course in specialized industries at the University of Florida. Lastly, I had meetings with industry specialists in health care and banking audits at the Big Six accounting firm that provided the subjects and account receivables and billing executives of a large hospital and a local bank. This was done to acquire more specific information about issues and aspects of account and loan receivables in these two industries. These sources provided the resources and information needed for developing the cases.

In general, the accounts receivable or loans receivable subsystems were chosen because they require specialized knowledge to audit including regulatory requirements, industry and firm price trends and sales volume, competitive conditions, customer characteristics, general economic conditions, credit policies, future prospects, number and quality of personnel, job rotation policies, number of hours worked in prior years, industry conditions, price changes, sales mix, internal control, and ownership (Joyce, 1976).

One Big six firm provided work paper information from a hospital and a bank engagement. The figures in the original work papers were modified or scaled by a factor in order to mask the original amounts. Modifying the original numbers was also necessary to allow seeding of the relevant errors in the cases.

Case Content

Each set of case materials included a cover letter which described the purpose and duration of the study and consent letter required by the University of Florida. The subjects were assured in the cover letter that their identity would remain anonymous. The second page presented the manipulation of the review process and additional instructions for completing the cases. The instructions requested the subject to work independently and not to seek help from other individuals or firm reference materials. The subjects were then told to spend about half of the allocated time on each case. Each case was placed in a separate envelope and labeled booklet 1 and booklet 2. This provided control so that participants would complete one case before completing the second case.

The team code, booklet number, and case type (health care or banking) were inscribed on the front part of the envelope so that the subjects knew, at any time, which booklet they were working on. The cover letter, instructions page, and the two envelopes were placed in a manila folder. The folder was used by participants to conveniently store the completed work papers for transmission to the researcher. As described below, each set of the work papers were pre-coded with a team code.

Each case consisted of three parts. The first part provided the instructions for completing the case and background information about a hypothetical hospital or bank.

This background information included an overview of the company's accounts receivables or loan receivables, audit plans, and the firm's financial data, i.e., the balance sheet and income statement for two years. The senior (manager) subjects were instructed to assume the role of an in-charge (engagement manager) for the current audit and to read the background information about the hypothetical hospital or bank. The subjects were also informed that they would be asked to (1) make a preliminary judgment about the likelihood of material misstatement in the financial statements and the likelihood that the subordinate detected such misstatements, (2) review the work papers which included a partial audit program for accounts or loans receivable and related accounts, unaudited balance sheet and income statement, and the subordinate's work papers which included a lead sheet, schedules, audit memos, and conclusions, (3) prepare any review notes or comments using pre-printed work papers that were provided, (4) make a final judgment about the likelihood of material misstatement in the financial statements and the likelihood that the subordinate detected such misstatements, and (5) complete a post-study questionnaire.

The subjects were instructed to assume that any work paper not included was properly prepared and references to the work papers were correct. They were also told that their work may be reviewed by an audit manager for the senior subject and by a partner for the manager subjects. This statement was made in order to simulate an actual audit setting in which auditors are traditionally accountable for their work.

After reading the company's background information and the financial statements, the subjects were asked to provide their perception of the risk of material misstatements

existing in the accounts or loans receivable and related accounts and to rate the likelihood that the subordinate (staff or senior) who prepared the work papers and/or review notes detected the misstatements. This rating was the preliminary measure of the reviewer's perceived risk of misstatements in the work papers. The subjects then wrote down the time they began the review of the work papers.

The second part of the case materials included the work papers for either hospital's accounts receivable or bank's loans receivable and loan reserves. Each work paper was identified with a reference number and an indication of whether it was prepared by the client or by the accounting firm. The subjects were asked to review the work papers and use a pre-printed review note form to record their review notes. The pre-printed review note forms contained two columns: "W/P Ref No" to indicate where the reviewer should write the work paper reference number and "Review Notes" to indicate where the reviewer should write the review notes. There was no restriction on the subject's ability to refer back to prior pages of the case materials and there were no restrictions on the type²⁶ or form of review notes the subject could write.

After reviewing the work papers the subjects were asked to provide a final assessment on the likelihood of any remaining material misstatement and to rate whether

²⁶ If there was a potential disadvantage in allowing the reviewers to review the work papers and write review notes in any format they chose, this disadvantage is mitigated by the fact that a pre-determined number of material errors were seeded in the cases. Thus, an effective and efficient review should identify the material errors and the format in which a reviewer identifies the seeded errors should not become a critical issue.

the subordinate detected the misstatements. They also recorded the time the review of the materials was completed.

The third part of the case material requested demographic information about gender, age, rank, total audit experience, specialized experience, other experiences in current or other specializations, ability to conduct audits in healthcare and banking, the realistic nature of the case, their reliance on the subordinate's expertise and specialization, and level of effort expended based on the reviewer's perception of the subordinate's specialized knowledge (see Appendix A).

Seeding of Errors and the Nature of Errors in the Error Rating Task

A total of twenty-two misstatements were seeded within the body of the two cases by modifying the figures or the context of events in the case materials. All of these errors were judged by an independent group of partner experts (see below) as material and critical errors. Of the twenty-two errors, 12 errors were healthcare case errors and 10 errors were banking case errors (see Table 3-4 below). The errors were seeded in the working papers to create a rich situation for investigating the review process and its effectiveness and efficiency in detecting material misstatements.

Each set of seeded errors contained mechanical and conceptual errors again as determined by an independent group of audit partners. The errors also varied in their frequency of detection, their importance to the audit, their conceptuality, and their difficulty to detect. Many of these errors are industry specific and only specialized auditors with specialized knowledge of the specific industry or higher team members are likely to be able to detect them. In testing the effectiveness of the review process, both

mechanical and conceptual errors were seeded because, in practice, audit staff and in-charge senior normally perform the mechanical or detailed aspects of the audit tasks and the manager and partner perform the judgment aspect of the audit task. In addition, prior research (Ramsay, 1994; Bamber and Ramsay, 1997) have shown that lower team members detect more mechanical errors while higher team members detect more conceptual errors.

Case Evaluation and Pilot Test

After completing the development of the banking and healthcare cases the researcher sent the materials to the respective industry specialist at the Big Six firm for review. Each specialist reviewed the materials and made suggestions for revising the cases. Each specialist was asked to evaluate the relevance and appropriateness of the cases and how the errors were seeded in the case. They were also asked to provide judgments as to the realistic nature of the cases and the seeded errors. Based on this initial review, the cases were revised. The revised cases were again sent to the specialists for a final review. The specialists judged the cases to be realistic and the errors appropriate and relevant given the nature of the cases and the orientation of study.

To provide an additional check on the generalizability of the case materials, each set of case materials was also sent to an audit partner of another Big Six firm specializing in the respective industries. These partners proposed minor changes that were communicated to the original industry specialists. These specialists judged the suggestions from the other firm's partners as appropriate for inclusion in the case

materials. These suggestions were then incorporated in the case materials before conducting the pilot test.

The case materials were pilot tested using six doctoral students, two college professors and two audit seniors in a Big Six firm. Four of the doctoral students had experience as audit seniors. One of the students had experience in banking audits and another had experience in hospital audits. Each of the audit seniors had experience in banking or healthcare. The two college professors had prior experience in bank audits. The sample size was too small to draw any statistical conclusions, but no major problems were noted with the experimental instrument. One small change was made to the rating scales utilized for the post-study questionnaire. In the pilot study, virtually all the respondents rated the cases as very realistic in nature. One respondent thought that having non specialists perform a specialist's task is not realistic in a practical sense. Most subjects completed the task in 60-75 minutes.

Subjects

The subjects who participated in the *main* study included 144 auditors (72 audit seniors and 72 managers) from 42 offices of one Big Six firm. One half of the seniors and managers specialized in hospital audits while the other half specialized in banking audits. The mean months of experience for the seniors and managers were 45.50 and 87.70, respectively. Table 3-1 presents the demographic data for the participating subjects.

Table 3-1
Subjects Profile and Summary Data
By Industry Specialization and Length of Audit Experience

Industry Specialization	Number	Male		Female		CPA	Total Audit Experience*		Industry Experience	
		Manager	Senior	Manager	Senior		Manager	Senior	Manager	Senior
Banking	72	17	19	19	17	72	85	37	68	34
Health care	72	18	17	18	19	72	90	54	84	40

*Months of total audit experience

Selection of Subjects

A partner from the executive office of the firm sponsoring the dissertation provided a health care audit specialist and a financial services audit specialist to assist with the selection of subjects for the study. After discussing with the firm specialists²⁷ and the dissertation committee members concerning the kinds of subject required for the study, only the health care and banking auditors participated in the study.²⁸ Control over subject selection was essential to ensure that the subjects' specialized industry knowledge was correctly mapped to the specialized task they were being asked to perform. In general, the criteria for selecting auditors for participation in this study were (1) the auditor is designated by the firm as specializing in healthcare or banking audits, (2) the auditor's principal work assignment was hospitals or banking, and (3) auditor possesses the industry specific knowledge of hospital or banking tasks.²⁹

Constructed Review Process Teams

The review process teams utilized in this study were constructed from the pool of senior and manager subjects. A constructed team has features that are identical to a real

²⁷ The two industry specialists are different from the specialists that helped me with the cases. These specialists also provided me with several other contacts at various offices of the firm.

²⁸ Insurance, real estate, mutual funds or investment auditors are included in the firm's financial services group. Similarly auditors who audit medical or pharmaceutical companies are included in the firm's healthcare group. Given the nature of the banking and hospital task. These set of subjects would not have the necessary type of industry experience and were not included in this study.

²⁹ Although no direct test of knowledge was conducted, the auditors' principal areas of audit were in either hospital or banking.

life audit team in which a subordinate is reviewed in his or her absence.³⁰ One purpose of using constructed teams was to preserve the hierarchical structure of the review process in an experimental team setting. A second purpose was to examine the benefits of the review process by having auditors use general experience and specialized knowledge to detect misstatements when reviewing the work of a subordinate.

Seventy-two dyad teams were constructed with 36 teams³¹ from the health care industry pool of auditors and 36 teams from the banking industry pool of auditors. Each dyad team consists of senior and manager from the same industry specialization. Each subject was randomly assigned to a dyad team by using the following metric. Each completed work of an audit senior was assigned a two-letter plus two-digit team code which was printed at the bottom left of the work paper case materials. The first letter in the team code (S or M) identifies the level of the team member as *either* a senior ("S") or a manager ("M"). The second letter in the team code (H or B) identifies the industry of the auditor as *either* health care ("H") or a banking ("B"). The first digit of the team code identifies the version of the case the subject received (described later). The second digit of the team code identifies the team number.

³⁰ The economic resources consumed by having a manager perform a face to face review with a specialized senior was enormous and the Big 6 firm was not willing to commit that level of resources for the experiment.

³¹ Since the design in this experiment calls for equal number of subjects in each cell, seven healthcare seniors, ten banking seniors, and four banking managers were dropped from the dyad team grouping. This was necessary because only 36 usable healthcare manager instruments were received. The metric for deleting the subjects from the grouping was to include the instruments received first.

Additionally, the letter “I” or “T” were also pre-assigned with the two case materials, these letters were sandwiched between the code letters and the code digits. If a set of case materials had the letter “I” coded on it, it signified that the subject’s completed work paper was pre-marked as work performed individually and was not subject to review. However if the set of case materials had a “T” on it, this indicated that the subjects completed the work papers as a part of a team and would be reviewed further.

To illustrate this metric, a team member designated as SH1(HI/BT)-1 indicates that the team member is a senior in a health care team and version1 case³² material was received. Likewise, a team member designated MH1(HI/BT)-1 indicates that the team member is an audit manager in a health care team version 1 of the case was received. The team in which this manager belong is team number 1 and the manager also received version 1 of the case material. With this metric, the senior and the manager described above both belong to team number 1. The same metric was also applied to teams constructed using the specialized bank auditors. The advantage of this approach is that it allowed me to separate the work completed by managers and seniors and the work performed as individuals and those performed as part of a team.

Pre-Matched Team Members

The importance of the team code metric is that it facilitated the pre-matching of a senior with a manager in a team and the tracking of the work completed by each member

³² There were four versions of the case material. They are: (1) Individual-In-specialization, Team- Out of Specialization, (2) Individual-Out of Specialization, Team- In-specialization, (3) Team-In- Specialization, Individual- Out of Specialization, and (4) Team-Out of Specialization, Team In Specialization.

of the same team during data collection. The first step in matching a manager with a senior began by assigning a senior level team code to the senior completed work papers.³³ Next, a duplicate copy of the work papers and review notes³⁴ prepared by the senior were made for review by a manager.³⁵ If the senior's completed work papers were not pre-labeled for review, no copy was made and the senior's review data were processed as "individual" data for testing individual versus team processing. Next, the manager level instructions and post-study questions were substituted for the relevant pages of the copy. Finally, the completed copy of the work papers was sent to a manager who had been randomly selected from the list of manager subjects.³⁶ With this method, the completed work of a senior and manager belonging to the same team were matched and tracked during data collection. Figure 3-5 presents the diagram of the distribution of the subjects for the experimental task.

³³ Completed work papers include seniors' review notes and comments.

³⁴ The review notes were typed by a research assistant before they were sent to the manager for review. Typing them was necessary because some of the words in the hand written review notes were not readily decipherable and typing them saved the managers time when reviewing the work papers. In addition the review notes were printed on colored paper for easy identification by the manager during the review.

³⁵ Each set of work paper case materials was pre-labeled for review or not for review by using a combination of the following letters: HI, HT, BI, or BT, where the letter "I" stands for Individual processing and letter "T" stands for team processing. For example, if a senior received work papers that were labeled (HI/BT), this indicated that the senior performed the hospital case individually and the banking case for review. In making a clone, only the banking case clone would be made and sent to the manager in the team for review.

³⁶ The manager was also privy to the senior's personal notes, markings and calculations made on the work papers when writing the review notes. However, the manager was not privy to the post-study questionnaire completed by the senior.

Procedures and Administration

I administered the cases to audit seniors and managers in two-phase testing over a six month period. In phase one, I administered the case materials in person to the healthcare and banking audit seniors at separate group sessions that were specially arranged by the firm that provided the subjects. These sessions produced 30 healthcare and 38 banking audit seniors. An additional 27 healthcare and 25 banking senior responses were received from other offices by mail because it was not possible to organize onsite meetings at these offices. Fourteen healthcare and 17 banking responses were unusable because they were *either* (1) completed by a staff auditor, (2) completed by seniors without hospital or banking audit experience, or (3) without complete documentation.

The instructions for the study were the same for both the onsite and mail administration, except that a sentence in the cover letter that requested the subjects to return the completed materials to the researcher by a certain date was unnecessary for the onsite testing. At the onsite testing, I introduced myself³⁷ and told the subjects that I would answer any questions they had about the cases. Only one participant who came a few minutes late asked a question regarding which order to solve the cases. The time allowed to complete the cases at the senior level was 75 minutes. The seniors completed the cases, on average, in 65.27 minutes. There was no statistical difference in the performance of the onsite and mail administration groups in the self-reported amount of

³⁷ The cover letter also introduced me.

time spent in completing the cases. Table 3-2 presents the time spent by the teams on each case.

Table 3-2
Length of Time Spent in Completing the Cases
by Industry Specialization and Processing Mode*

Industry Specialization	Bank Case	Hospital Case	Overall
Banking -Senior	32.13	25.33	57.46
-Manager	30.07	26.62	56.69
-Team	26.87	33.93	60.08
Healthcare-Senior	34.15	38.72	73.07
-Manager	32.94	29.30	62.24
-Team	39.49	29.62	69.11

* Time spent is in minutes. "Team" time represents the amount of time spent by the review team manager in reviewing the work of the senior.

In phase II, I mailed 180 case instruments to a randomly selected group of 90 healthcare and 90 banking audit managers. For the banking manager subjects, contact persons at the office of the Big Six firm distributed the materials and coordinated the return of the completed materials to me. Each set of case materials included a self addressed, stamped envelope for the subjects to use in mailing the completed instruments directly to me. For the healthcare manager subjects, the Big Six firm provided a list of names and addresses and I randomly mailed the case instruments directly to the subjects selected from this list. Consistent with the practice in an actual audit setting where the detailed audit work consumes more time than review of the completed work, the time allocated for the managers' phase was 60 minutes. The managers completed the task, on average, in 59.47 minutes. Forty-one completed healthcare case materials were received

and forty-three completed banking were received from the audit managers. Five of the of the healthcare and three of the banking audit manager instruments were unusable because they were either incomplete or they were completed by audit seniors. Because only 36 useable case materials were received at the senior level, only 36 teams of the pre-constructed teams are included.

Error Rating Task

The objectives of the error rating task were to gather independent, expert information on (1) the relative frequency of the selected errors (2) the importance of the errors, (3) which member of the audit team in the industry or out of the industry is likely to detect the errors, and (4) which errors are mechanical or conceptual.

There is no measurement criteria in the auditing literature for determining which errors are conceptual or mechanical in nature or for determining the potential multidimensional nature of errors. By having audit experts (industry partners) rate the errors on these dimensions, I was able to use an independent measure to classify the subject's responses in the main study as *conceptual* or *mechanical* and to categorize errors along other dimensions during data analysis.

Development of Seeded Errors

In developing the errors seeded in the cases for the main study, I considered the importance of the accounts receivable and loans receivable subsystem of the healthcare and banking industries and the kind of errors that occur in the audit of these accounts. I consulted various auditing and related text books, academic, practice, and industry-specific journals, and trade journals. I also had meetings with (a) industry specialists in

health care and banking audits at the Big Six accounting firm that provided the subjects and (b) account receivables and billing executives of a large hospital and a local bank. This was done to acquire more specific information about issues and aspects of account and loan receivables in these two industries. Based on these meetings and using the audit work paper information provided by the Big Six firm, I developed a list of 24 errors ³⁸ to seed in the two cases.

Nature of Errors in the Error Rating Task

Each error included in the rating task varied in their frequency, importance, difficulty to detect, and conceptuality. For example, some of the errors were intentionally easy to detect and therefore should be detected by auditors possessing general audit knowledge. Such errors are classified as *mechanical*. Other errors were more difficult to detect because they require more judgment and experience to identify and are considered *conceptual* errors. Many of these errors are industry specific and only auditors with specialized knowledge of the industry are likely to detect them.

Error Task Evaluation and Pilot Testing

After developing the list of errors for the error rating task, I sent the materials to the respective industry specialist at the Big Six firm for review. Each specialist reviewed the list of errors for the two error rating tasks and how they were seeded in the main cases. Each specialist was asked to use their knowledge of the seeded errors in evaluating

³⁸ Only twenty-two were used in the cases because the industry experts who rated the errors indicated two of the errors to be non critical errors. Of the twenty-two errors, 12 errors were seeded in the healthcare case and 10 errors were seeded in the banking case.

their relevance and appropriateness to the cases. They were also asked to provide judgments as to the realistic nature of the seeded errors. Based on their initial review, the error rating task were revised.

To provide an additional check on the generalizability of the error rating task, a copy was sent to two audit partners of another Big Six firm who specializing in each industries. These partners proposed minor changes that were communicated to the coordinating industry specialists. The specialists judged the suggestions from the other firm's partners to be appropriate for inclusion in the final error rating task and they were incorporated in the final instrument. The final error rating task was pilot tested with two senior audit manager specialists of the Big Six firm who spent approximately 15 minutes each in completing the error rating task

Procedure and Administration

The error rating task was mailed to each audit partner at his or her office with instruction on how to complete the instrument. The partners were instructed to return it directly to me. If more than one partner was available in a participating office, one partner served as the main contact person who distributed the instruments to other partners and collected the completed instruments for transmission to me. A total of 100 instruments were distributed (50 healthcare and 50 banking) with a 40 percent and 62 percent return rate, respectively. The error task instrument is presented in Appendix B.

Subjects

The error rating task was administered to twenty healthcare and thirty-one banking partners. The mean (median) years of experience of the partners was 19.47

(17.00). Thus a highly experienced group of partners with specialized industry experience completed the rating task. Table 3-3 presents the summary data for the subjects who participated in the error rating task. The column with “other” are numbers of partners who had audit experiences in other industries. For example, of the banking subjects, 15 partners noted experiences in finance /real estate, investing/insurance (9), tax (1), SEC (1), computer controls (3), and not for profit(1). Of the healthcare subjects, 8 had other industry experiences; manufacturing (2), medicine and third party billing (2), strategic planning(1), bank engagement(1), and government (1).

Table 3-3
Subjects Profile and Summary Data
By Industry Specialization and Length of Audit Experience

Industry Specialization	Total	Years of Audit Experience	Years of Industry Experience	Other Experience
Banking	31	19.38	17.90	15
Healthcare	20	19.38	16.84	8

Error Categorization Metric.

The results of the error rating task are presented in Table 3-4. The frequency scores are mean relative frequency scores for each error and the importance scores are *weighted* relative importance scores for each error. The weighted relative importance scores were calculated as follows: First, the total scores for each subject was determined, then each error identified by this subject was weighted by the subject’s total errors scores. Second, the relative weights for each subject were summed across all subjects for each error to obtain the average weighted relative importance score. The list of the errors are

presented in Figure 3-6, while Table 3-4 provides the distribution of the error types with respect to detection by relative frequency and weighted relative importance of the errors.

Figure 3-6
List of Industry Specific Seeded Errors

Panel A: List of Seeded Banking Errors

1. Current period revenue includes interest income from non accrual loans.
2. Current period revenues reduced by charged-off loans.
3. Allowance for uncollectible loans not fully recorded.
4. Revenues recorded but not earned due to misclassification of loans.
5. Current year recoveries not recorded or understated.
6. Interest payments received on non performing loans not treated on cash basis.
7. Re-estimated allowance for loan loss reserve are more than reported allowance due to mis-classification of loans.
8. Payments received on written-off loans are used to reduce loan principal instead of re-instituting the loss and recognizing revenue.
9. Loans are mis-classified.
10. Allowance for uncollectible loans in the balance sheet does not match the balance from test of details.
11. Payments received on non accrual/non performing loans are used to reduce loan principal instead of recognizing interest revenue.

Panel B List of Seeded Healthcare Errors

1. HMO accounts included in Medicare contractual adjustment report.
2. Allowance for uncollected accounts has not been adjusted for current period recoveries.
3. Fund Balance does not roll.
4. Failure to record current period contingent liability for prior period over billing of Medicare.
5. Current period Medicare receivables are not properly contractualized.
6. Current period HMO receivables are not properly contractualized.
7. Failure to separate Medicare and Medicaid patient's charges.
8. Billing Medicare for patient charges that are more than allowable DRG charges.
9. Billing Medicare for non-covered and full outpatient charges.
10. Current period revenue reduced for prior year Medicare adjustment instead of recognizing a liability.
11. Allowance for uncollectible accounts in balance sheet does not match the balance from test of details.
12. Credits, co-payments, and deductions larger than normal.
13. Clean up of accounts receivable at year end.

Table 3-4

Error Rating Task
Summary and Profile of Seeded Banking and Healthcare Industry Specific Errors

Panel A: Bank Case

Dimension of Error	Distribution of Error									
	Error 1	Error 2	Error 3	Error 4	Error 5	Error 6	Error 7	Error 8	Error 9	Error 10
Relative Frequency Means	35.87	24.10	45.00	15.10	8.73	31.38	26.18	25.50	37.33	24.67
Weighted Relative Importance Means	0.108	0.069	0.305	0.091	0.045	0.072	0.113	0.038	0.067	0.095
Conceptuality-Mechanical	M(90)	-	-	M(100)	M(90)	-	-	-	M(90.3)	M(93)
Conceptual	-	-	C(100)	-	-	C(90.3)	C(90.3)	-	-	-
Mixed	-	MX(77)	-	-	-	-	-	MX(63)	-	-
Detectability-Senior	30	28	21	28	26	29	28	25	30	31
Manager	19	20	29	15	9	19	23	14	17	22
Partner	11	12	30	6	2	5	18	7	8	17
Non Bank-Yes	12	12	9	7	7	7	9	5	15	25
-No	17	17	19	21	19	19	18	22	13	5

Legend: The numerical figures correspond to the label of the error in Panel A and Panel B of figure 3-5. For example, error 1 in Table 3-4 Panel A corresponds to error 1 in panel A of figure 3-5

Panel B: Healthcare Case

Dimension of Error	Distribution of Errors											
	Error 1	Error 2	Error 3	Error 4	Error 5	Error 6	Error 7	Error 8	Error 9	Error 11	Error 12	Error 13
Relative Frequency Means	14.79	17.89	26.05	24.50	53.00.	65.00	13.42	22.61	23.88	50.17	30.94	54.16
Weighted Relative Importance Means	0.069	0.059	0.083	0.115	0.147	0.123	0.091	0.071	0.084	0.064	0.034	0.054
Conceptuality												
Mechanical	M (90)	-	M (93)	-	-	-	M(90)	-	-	M(90)	-	-
Conceptual	-	-	-	C(90)	-	C (94)	-	-	-	-	C(90)	-
Mixed	-	MX(63)	-	-	MX(55)	-	-	MX(63)	MX(63)	-	-	MX (58)
Detectability												
Senior	19	19	18	11	17	16	19	14	16	18	17	18
Manager	12	14	14	15	17	17	15	9	9	13	16	13
Partner	8	10	13	14	14	13	9	8	8	10	11	11
Non Health care												
Yes	3	16	19	2	2	1	2	2	2	16	4	16
No	16	5	0	17	17	17	17	17	15	2	15	3

To determine the conceptuality of the errors, the subjects' responses were used to categorize the errors into their respective error type classes ³⁹ (mechanical, conceptual, and mixed). To categorize each error into its respective error type class, I used the following approach: If 90 percent or more of the industry partners rated an error to be clearly mechanical or conceptual, that error was categorized as such. If less than 90 percent of the partners rated an error as mechanical or conceptual, the error was categorized as *mixed*. This metric produced the error types presented in Table 3-5.

TABLE 3-5
Distribution of Seeded Errors Types

Case	Mechanical Errors	Conceptual Errors	Mixed Errors
Banking	5	3	2
Healthcare	4	3	5

Table 3-5 also shows the detectability of each error type summarized by categorizing which error or error types are detectable by each member of the audit team or non specialist member of the team.

Dependent Variables

The dependent variables were (1) risk reduction (RR) measured by the proportion of detected errors and (2) perceived risk reduction (PRR) measured by comparing the difference scores for pre and post rating of perceived risk of material misstatement in the

³⁹ In summarizing the partners' ratings of the errors, certain errors could not be neatly classified as *mechanical* or *conceptual* errors. The partners rated these class of errors as possessing both *mechanical* and *conceptual* properties. These class of errors are referred to as *mixed* errors in this study.

subordinate's work by the superior senior or manager. The two dependent variables measure the effectiveness of the review process in reducing the risk of material misstatements, that is, the extent to which an auditor's examination of the audit work papers signals a reduction in the risk of misstatement through performance and through perception. If a subject identified a seeded error in the case, the subject is said to have detected an error and thus reduced risk. Identified misstatements that were not seeded by researcher are not included in determining the level risk of reduction.⁴⁰

Measurement of the Dependent Variable- Risk Reduction

The following equation was used to quantify and estimate the proportion or amount of risk reduction (RR) that took place in the review process. RR_{ijkl} represents the total risk reduction score for each participant (individual or team) summed over all the factors in the experiment and it measures the proportion of detected misstatements during the review process. When a misstatement is not detected by a subject, RR_{ijkl} takes the value of 0 for the undetected error for that particular subject at that particular level of the review hierarchy. RR_{ijkl} takes the value of 1 if a misstatement is correctly detected by a subject. The larger the value of RR_{ijkl} , that is, the larger the proportion of detected misstatements, the larger is the amount of risk reduced by the review process at that team level.

⁴⁰ Items that were falsely identified, but which were not seeded critical misstatements were not measured in this study since they do not affect the effectiveness in detecting the seeded errors.

$$RR_{ijkl} = \frac{P_{ijkl}}{N_{\max=10,12}} \quad (2)$$

$$P_{ijkl} = \sum_{m=1}^{10,12} P_{ijklm}$$

$$\text{where: } P_{ijklm} = 1 \text{ (found)}$$

$$= 0 \text{ (not found)}$$

i = Individual vs. Team

j = Task Pair for Individual vs. Team

k = Level of Review hierarchy (senior vs manager).

l = Specialization (Health Care vs. Banking)

ml = Team nested in Specialization

m(_{*ij*}) = Error nested in Specialization and Pairing of Task.

P_{ijklm} records the value for each seeded misstatement detected by each team or team member within each specialization. N_{\max} is an index for counting the number of possible misstatements in each of the two cases. In this study, the upper limit of N_{\max} was 12 for the health care case and 10 for the banking case. The minimum score obtainable in each of the cases is 0. Each subject's total score across the two tasks or within an industry is also measured using this equation. For example the range of the RR scores is 0.00 to 1.00, thus a subject who detected 8 healthcare errors would receive a score of 0.50. Table 3-6 presents the list of the variables utilized in this study. The symbols below indicate the following:

SI-senior individual

ST- Senior in team

MI-Manager individual

MT-Manager in team

Coding of Review Notes

The coding of review notes was done by two independent coders. One coder was a former bank audit manager specialist at the Big Six firm that provided the cases and the subjects for the study. The second coder was an adjunct professor of accounting at a local university and he possessed a doctoral degree in accounting. His teaching and research interest are in financial and international accounting. Neither of the two coders had specialization or working knowledge in the healthcare industry. The two independent coders had no previous knowledge of the research questions prior to coding the review notes. It was believed that such awareness would have led to coding biases in favor of one specialization versus the other.

The agreement between the two coders was 96 percent. The areas of disagreement involved bank error number 11 and health care error number 10. There was no attempt to reconcile the coders on these two items, rather the two errors were excluded from the analyzes because the industry partners also who participated on the error rating task also disagreed on whether these error were material errors or just house keeping errors. The coders were provided with copies of the test instruments that listed the errors seeded in the case, each subject's review notes, and a set of case materials. The guidelines included the following instructions:

The following are the guidelines for the errors you are being ask to code for the banking (health care) case. You are to use your own judgment and the guidelines

provided in recording whether a subject detected an error or not. Use the form provided for each subject to record a "1" for each error detected, if in your judgment the subject detected the error or record a "0" if in your opinion the subject did not detect the error.

The criteria suggested for recording whether a subject detected or did not detect an error include:

- (1) the subject's review notes raised significant questions or context issues that are tangential to a specific error topic that you are coding, if this occurs, the subject is said to have detected that error.
- (2) The subjects are not expected to write the exact words as recorded on the guideline. A subject may write a series or fragments of sentences that when taken together, may convey the judgment that he or she has detected a specific error.
- (3) Technical errors, that is, errors that merely make the work papers to look good with respect to presentation are not considered to be detection of errors.

TABLE 3-6
Description of Variables

Variables	Description of Variables
INDUSTRY	Banking and Healthcare teams
TASKPAIR	Task Pairing-Interaction of alone vs. team and IN/OUT of specialization (1) In specialization with alone and team and (2) Out of specialization with alone and team.
PROCMODE	Individual Versus Team processing
LEVEL (Review Hierarchy)	Manager and Senior-Level of Auditor
RR _{ALL}	Overall model error scores
RR _{SIM}	Individual Senior Mechanical error scores
RR _{SIC}	Individual Senior Conceptual error scores
RR _{SIX}	Individual Senior mixed error scores
RR _{STM}	Team Senior mechanical error scores

RR _{STC}	Team Senior conceptual error scores
RR _{STX}	Team Senior mixed error scores.
RR _{MIM}	Individual Manager mechanical error scores
RR _{MIC}	Individual Manager conceptual error scores
RR _{MIX}	Individual Manager mixed error scores.
RR _{MTM}	Team Manager mechanical error scores
RR _{MTC}	Team Manager conceptual error scores
RR _{MTX}	Team Manager mixed error scores.
PRR _{SI}	Difference of pre and post score for Individual senior
PRR _{ST}	Difference of pre and post score for team senior
PRR _{MI}	Difference of pre and post score for Individual manager
PRR _{MT}	Difference of pre and post score for team manager
PRESA	Pre-Review rating of perceived risk by individual Senior
POSTSA	Post Review rating of perceived risk by individual senior
PREST	Pre-Review rating of perceived risk by TEAM Senior
POSTST	Post Review rating of perceived risk by TEAM senior
PREMA	Pre-Review rating of perceived risk by Individual Manager
POSTMA	Post Review rating of perceived risk by Individual Manager
PREMT	Pre-Review rating of perceived risk by TEAM Manager
POSTMT	Post Review rating of perceived risk by TEAM manager

CHAPTER 4 RESULTS

This chapter presents the results of the study. The first section reports the results of the manipulation checks. The second section presents the effect of general audit experience on reducing risk during the review process. The third section examines the effectiveness of individual versus team processing in risk reduction while the fourth section presents the results of industry specialization on risk reduction. The last section presents the results of the reviewer's perceived risk of material misstatement on the subordinates working papers.

Manipulation Checks

A counterbalancing methodology was used in the experimental design to test: (1) for possible differences in the order in which the cases were presented to the subjects and (2) for any differences in the two cases used in the study. The results of the overall ANOVA are presented in Table 4-1. The dependent variables (RR_{ALL}) that were used in this model are the 12 dependent variables shown in Table 3-6. The independent variables, their descriptions, interactions, and expected effects are presented in Figure 3-4. The order⁴¹ in which the teams worked the cases was predicted to have no effect on how the teams performed. Two orders for the cases were used to mitigate

⁴¹ The two orders are healthcare/banking case and banking/ healthcare case.

potential order effects. As shown in Table 4-1, the ORDER variable was not significant ($F = 0.10$; $p = .756$).

The effect of possible differences in the difficulty of the two cases is tested by examining the PROCMODE x INDUSTRY x TASKPAIR interaction term. In Figure 3-4, this interaction was described as resulting from the contrast coding effect that tests the effect of Banking versus healthcare case. This term was not significant ($F=0.09$; $p=.769$) indicating that neither the banking case nor the healthcare case was more difficult for the subjects to complete.

In addition to testing for effects due to order and difficulty of case, three other terms in the overall model are examined in order to test for other possible influences on the results. First, the interaction of LEVEL x INDUSTRY examines whether there is more risk reduction due to being a senior or manager in either healthcare or banking. This interaction was moderately significant ($F = 3.32$; $p = .073$). Further analysis indicates that this is due to the healthcare seniors identifying more mechanical errors in the banking case than the banking seniors identified in the healthcare case.⁴² Second, the interaction of PROCMODE x INDUSTRY tests whether individual or team processing differs across industry. This interaction was not significant ($F = 0.16$, $p = .691$). Third, the interaction of LEVEL x PROCMODE x INDUSTRY examines whether experience

⁴² This interaction suggests the possibility of a one way transfer of knowledge from the healthcare auditors to a banking task. The possibility of a non uniform transfer of knowledge across industries further enhances the uniqueness of industry specific knowledge in some tasks.

(senior or manager) or individual versus team processing differs across banking and health care teams. The interaction was not significant ($F = 0.36$; $p = .548$).

TABLE 4-1
Results of Full Model Analysis (ANOVA)
Repeated Measures Analysis

MODEL: $RR_{ALL} = \text{INDUSTRY, TASKPAIR, ORDER, LEVEL, PROCMODE, ERRTYPE}$

Source	<i>df</i>	<i>Sum of Squares</i>	<i>F-value</i>	<i>P-value</i>
INDUSTRY	1	0.0247	4.91	0.030
TASKPAIR	1	0.0472	9.63	0.003
ORDER	1	0.0005	0.10	0.756
INDUSTRY x TASKPAIR	1	0.0004	0.08	0.780
INDUSTRY x ORDER	1	0.0004	0.07	0.793
TASKPAIR x ORDER	1	0.0054	1.06	0.306
INDUSTRY x TASKPAIR x ORDER	1	0.0007	0.13	0.720
Error (Team/Industry, Taskpair)	64	0.3216		
Within Factors				
LEVEL	1	0.4809	136.28	0.000
LEVEL x INDUSTRY	1	0.0117	3.32	0.073
LEVEL x TASKPAIR	1	0.0169	4.78	0.030
LEVEL x ORDER	1	0.0008	0.24	0.628
LEVEL x INDUSTRY x TASKPAIR	1	0.0021	0.60	0.442
LEVEL x INDUSTRY x ORDER	1	0.0000	0.00	0.977
LEVEL x TASKPAIR x ORDER	1	0.0022	0.63	0.431
LEVEL x INDUSTRY x TASKPAIR x ORDER	1	0.0002	0.06	0.812
Error (Level x Team/Industry, Taskpair)	64	0.2258		

PROCMODE	1	0.0243	5.38	0.024
PROCMODE x INDUSTRY	1	0.0007	0.16	0.693
PROCMODE x TASKPAIR (In Versus Out)	1	3.1557	698.31	0.000
PROCMODE x ORDER	1	0.0018	0.40	0.529
PROCMODE x INDUSTRY x TASKPAIR	1	0.0004	0.09	0.769
PROCMODE x INDUSTRY x ORDER	1	0.0005	0.11	0.743
PROCMODE x TASKPAIR x ORDER	1	0.0013	0.28	0.597
PROCMODE x INDUSTRY x TASKPAIR x ORDER	1	0.0000	0.01	0.940
Error (Procmode x Team/ Industry, Taskpair)	64	0.2892		
ERRTYPE	2	0.7814	125.84	0.000
ERRTYPE x INDUSTRY	2	0.0193	6.22	0.003
ERRTYPE x TASKPAIR	2	0.0022	0.36	0.699
ERRTYPE x ORDER	2	0.0014	0.23	0.795
ERRTYPE x INDUSTRY x TASKPAIR	2	0.0002	0.04	0.960
ERRTYPE x INDUSTRY x ORDER	2	0.0042	0.68	0.507
ERRTYPE x TASKPAIR x ORDER	2	0.0002	0.03	0.967
ERRTYPE x INDUSTRY x TASKPAIR x ORDER	2	0.0049	0.78	0.459
Error (Errtype x Team/Industry, Taskpair, Order)	128	0.3974		
LEVEL x PROCMODE	1	0.0199	5.98	0.017
LEVEL x PROCMODE x INDUSTRY	1	0.0012	0.36	0.551
LEVEL x PROCMODE x TASKPAIR	1	0.1662	49.90	0.000
LEVEL x PROCMODE x ORDER	1	0.0002	0.06	0.807
LEVEL x PROCMODE x INDUSTRY x TASKPAIR	1	0.0090	2.69	0.106

LEVEL x PROCMODE x INDUSTRY x ORDER	1	0.0001	0.02	0.899
LEVEL x PROCMODE x TASKPAIR x ORDER	1	0.0002	0.07	0.792
LEVEL x PROCMODE x INDUSTRY x TASKPAIR x ORDER	1	0.0001	0.04	0.837
Error (Level x Procmode x Team/Industry, Taskpair)	64	0.2132		
LEVEL x ERRTYPE	2	0.2179	29.61	0.000
LEVEL x ERRTYPE x INDUSTRY	2	0.0410	5.58	0.005
LEVEL x ERRTYPE x TASKPAIR	2	0.0037	0.50	0.608
LEVEL x ERRTYPE x ORDER	2	0.0020	0.28	0.757
LEVEL x ERRTYPE x INDUSTRY x TASKPAIR	2	0.0017	0.24	0.785
LEVEL x ERRTYPE x INDUSTRY x ORDER	2	0.0106	1.44	0.242
LEVEL x ERRTYPE x TASKPAIR x ORDER	2	0.0095	1.29	0.279
LEVEL x ERRTYPE x INDUSTRY x TASKPAIR x ORDER	2	0.0023	0.31	0.732
Error (Level x Errtype x Team/Industry, Taskpair)	128	0.4710		
PROCMODE x ERRTYPE	2	0.0181	2.49	0.087
PROCMODE x ERRTYPE x INDUSTRY	2	0.0048	0.66	0.517
PROCMODE x ERRTYPE x TASKPAIR	2	0.4301	59.20	0.000
PROCMODE x ERRTYPE x ORDER	2	0.0010	0.27	0.763
PROCMODE x ERRTYPE x INDUSTRY x TASKPAIR	2	0.1579	21.73	0.000
PROCMODE x ERRTYPE x INDUSTRY x ORDER	2	0.0047	0.65	0.524

PROCmode x ERRTYPE x TASKPAIR x ORDER	2	0.0004	0.06	0.944
PROCmode x ERRTYPE x INDUSTRY x TASKPAIR x ORDER	2	0.0032	0.44	0.648
Error (Procmode x Errtype x Team/Industry, Taskpair)	128	0.4650		
LEVEL x PROCmode x ERRTYPE	2	0.0082	1.21	0.302
LEVEL x PROCmode x ERRTYPE x INDUSTRY	2	0.0037	0.55	0.578
LEVEL x PROCmode x ERRTYPE x TASKPAIR	2	0.0962	14.26	0.000
LEVEL x PROCmode x ERRTYPE x ORDER	2	0.0061	0.91	0.406
LEVEL x PROCmode x ERRTYPE x INDUSTRY x TASKPAIR	2	0.0226	3.34	0.038
LEVEL x PROCmode x ERRTYPE x INDUSTRY x ORDER	2	0.0025	0.37	0.691
LEVEL x PROCmode x ERRTYPE x TASKPAIR x ORDER	2	0.0000	0.01	0.995
LEVEL x PROCmode x ERRTYPE x INDUSTRY x TASKPAIR x ORDER	2	0.0110	1.62	0.201
Error (Level x Procmode x Errtype x Team/Industry, Taskpair)	128	0.4318		

The Role of General Audit Experience in Reducing Risk

Hypothesis 1: Risk Reduction Returns Due to Experience: Who Detects Mechanical and Conceptual Errors?

Hypothesis 1 examines whether general audit experience affects the amount and type of risk reduced. It is predicted that lower level reviewers would detect more

mechanical errors than higher level reviewers while higher level reviewers would detect more *conceptual* errors than lower level reviewers. H1 was examined by using only the individual data in comparing the amount and type of risk reduced by seniors working individually to that reduced by managers working individually. The dependent variables used in testing H1 are the proportions of errors detected by seniors and managers within each error type (mechanical and conceptual) category (RR_{SIM} , RR_{SIC} , RR_{MIM} , RR_{MIC}) across the two industries. Table 4-2 contains the results of the repeated measures ANOVA with LEVEL as the repeated variable and INDUSTRY and TASKPAIR as the between subject variables.

An examination of Panel A of Table 4-2 shows that the main effect of LEVEL is significant ($F=22.30$; $P=0.000$) indicating that the amount of risk reduced depends on the experience or level of the auditor in the team hierarchy. The combined error type means in Panel B of Table 4-2 column 2 indicate that managers, on average, reduced more risk than seniors with managers reducing 32.06 percent of risk versus 21.96 percent reduced by seniors. This overall finding is consistent with prior research (e.g. Ashton and Brown 1980; Ashton and Kramer 1980; Abdolmohammadi and Wright 1987; and Libby and Frederick, 1990).

To investigate the question of who better detects mechanical versus conceptual error types, the LEVEL x ERRTYPE interaction term in Panel A of Table 4-2 was examined. This interaction is significant ($F = 42.07$; $P = .000$) indicating that the detection of mechanical or conceptual error types depended on the level of the auditor. Panel B of Table 4-2 presents the means for the error types detected by seniors and

managers. As shown, seniors, on average, identified 32.36 percent of the mechanical errors while managers identified 28.47 percent. A simple effects tests indicated that the difference was marginally significant ($F = 2.04, p = .096$). Conversely, the managers

TABLE 4-2
Test of Hypothesis 1-Risk Reduction Returns due to Experience
Results of Repeated Measures ANOVA

MODEL: $RR_{SIM}, RR_{SIC}, RR_{MIM}, RR_{SIC} = INDUSTRY, TASKPAIR, LEVEL, ERRTYPE$

Panel A: ANOVA for Who Detects Which Error Type?

	<i>df</i>	<i>Sum of Squares</i>	<i>F statistic</i>	<i>p value</i>
Between Factors				
INDUSTRY	1	2,148.77	5.12	0.027
TASKPAIR	1	55,926.54	133.28	0.000
INDUSTRY x TASKPAIR	1	1,637.19	3.90	0.052
Error (Teams/Industry, Taskpair)	68	28,534.72		
Within Factors				
LEVEL	1	7,333.95	22.30	0.000
LEVEL x INDUSTRY	1	148.30	0.45	0.503
LEVEL x TASKPAIR	1	1,512.50	4.61	0.035
LEVEL x INDUSTRY x TASKPAIR	1	0.62	0.00	0.966
Error(Level x Team/Industry, Taskpair)	68	22,286.57		
ERRTYPE	1	3,334.72	10.22	0.002
ERRTYPE x INDUSTRY	1	222.83	0.68	0.411
ERRTYPE x TASKPAIR	1	6,296.91	19.30	0.000
ERRTYPE x INDUSTRY x TASKPAIR	1	211.27	0.65	0.424
Error (Errtype x Team/Industry, Taskpair)	68	22,182.87		
LEVEL x ERRTYPE	1	14,074.69	42.07	0.000
LEVEL x ERRTYPE x INDUSTRY	1	1,833.49	5.48	0.022

LEVEL x ERRTYPE x TASKPAIR	1	6,234.72	18.64	0.000
LEVEL x ERRTYPE x INDUSTRY x TASKPAIR	1	222.84	0.67	0.417
Error (Level x Errtype x Team/Industry, Taskpair)	68	22,749.54		

Panel B: Means for Manager Versus Senior detection of which error types⁴³

Variable (LEVEL)	Combined Error Types ⁴⁴	Mech.	Conc.
Manager	32.06	28.47	35.64
Senior	21.96	32.36	11.57

identified 35.64 percent of the conceptual errors while seniors only detected only 11.57 percent. A simple effects test indicated that the difference was significant ($F = 35.82$, $p = .001$). Thus, H1 is confirmed.

⁴³ Panel B is extended to include errors detected when the auditors are working individually

Panel B: Means for Manager Versus Senior detection of which error types

(LEVEL)	All Specialization		In Specialization		Out of Specialization	
	Mech.	Conc.	Mech.	Conc.	Mech.	Conc.
Manager	28.47	35.64	44.72	51.85	12.22	19.44
Senior	32.36	11.57	53.33	13.88	11.38	9.25

⁴⁴ Each auditor scores are summed over both specialization and out of specialization.

The Sequential-Hierarchical Review Process Hypothesis

H3: The Effect of Individual Versus Team Processing.

Hypothesis 3 predicted that a review team consisting of an audit manager and a senior working together will reduce more risk than a manager or senior working individually. H3 was examined by (1) comparing the risk reduced by managers working individually to that reduced by the review teams and (2) comparing the risk reduced by seniors working individually to that reduced by the review teams. The dependent variables are the proportion of errors detected by the managers and seniors working individually (RR_{MIM} , RR_{MIC} and RR_{SIM} , RR_{SIC}) and by the review teams (RR_{MTM} , RR_{MTC}) within each mechanical and conceptual error type category across all specializations.

The Manager Versus the Review Team

The amount of risk reduced by the manager working individually was compared to that of the review team by performing a repeated measures ANOVA on the data. The repeated variable was PROCMODE. The results of the repeated measure ANOVA are shown in Table 4-3. Panel A of Table 4-3 reveal that the main effect of PROCMODE is marginally significant⁴⁵ ($F = 3.63$; $p = .061$) suggesting that the amount of risk reduced depended on whether auditors are working individually or in teams. This is evidenced in panel B of Table 4-3 by the larger combined means for the review team (37.02 percent) compared to that of managers working individually (32.06 percent).

⁴⁵ PROCMODE is highly significant in the full model presented in Table 4-1.

TABLE 4-3
Test of Hypothesis 3- Individual Versus Team processing
Results of Repeated Measures ANOVA

MODEL: $RR_{MIM}, RR_{MIC}, RR_{MTM}, RR_{MTC}$ = INDUSTRY, TASKPAIR, LEVEL,
PROCMODE, ERRTYPE

Panel A ANOVA for Individual Manager Versus Team Processing.

	<i>df</i>	<i>Sum of Squares</i>	<i>F-statistic</i>	<i>p-value</i>
Between Factors				
INDUSTRY	1	4,834.72	9.89	0.002
TASKPAIR	1	3,565.43	7.30	0.087
INDUSTRY x TASKPAIR	1	285.33	0.58	0.447
Error (Team/Industry, Taskpair)	68	33,225.00		
Within Factors				
PROCMODE	1	1,766.82	3.63	0.061
PROCMODE x INDUSTRY	1	120.98	0.25	0.620
PROCMODE x TASKPAIR	1	112,285.33	231.01	0.000
PROCMODE x INDUSTRY x TASKPAIR	1	3,380.24	6.96	0.010
Error(Procmode x Team/ Industry, Taskpair)	68	33,052.16		
ERRTYPE	1	519.13	1.43	0.236
ERRTYPE x INDUSTRY	1	222.83	3.68	0.059
ERRTYPE x TASKPAIR	1	74.69	0.21	0.652
ERRTYPE x INDUSTRY x TASKPAIR	1	7.56	0.02	0.886
Error (Errtype x Team\ Industry, Taskpair)	68	24,669.44		

PROCmode x Errtype	1	1,452.00	3.88	0.053
PROCmode x Errtype x Industry	1	74.69	0.20	0.657
PROCmode x Errtype x Taskpair	1	81.63	0.22	0.642
PROCmode x Errtype x Industry x Taskpair	1	1,037.65	2.77	0.101
Error (Procmode x Errtype x Team/Industry, Taskpair)	68	25,459.56		

Panel B: Means for Manager (Senior) Versus Team Processing

<i>Variable (PROCmode)</i>	<i>Combined Error Types</i>	<i>Mech.</i>	<i>Conc.</i>
Review Team	37.02	37.92	36.11
Individual Manager	32.06	28.47.	35.64
Senior	21.96	32.36	11.57

The analysis is further extended to examining whether managers working individually and teams detect different error types. PROCmode x Errtype interaction term in Panel A of Table 4-3 indicates that the interaction term is significant ($F=3.88$; $p=.053$). This suggests that managers working individually are likely to detect different error types than a review team consisting of a manager and a senior. Panel B of Table 4-3 indicates that while the team detected 37.92 percent of mechanical errors, managers working individually detected 28.47 percent of the mechanical errors. A simple effects test indicated that the difference was marginally significant ($F = 2.87$; $p =$

.095) In contrast, the review team detected 36.11 percent of the conceptual errors, while the managers working individually detected 35.64 percent of the conceptual errors. A simple effects tests indicated that the difference was not significant ($F = 0.01$; $p = .940$). These results together show that a team is better than a manager working individually due to the team's effectiveness in better detecting more mechanical errors. The next section compares the performance of a senior versus that of a team.

The Senior versus the Review Team

The issue of whether team reduce more risk than individuals is further explored by comparing the amount of risk reduced by seniors working individually to that reduced by a review team consisting of a manager and a senior. The results of the ANOVA model shown in panel C shows significant effects for PROCMODE ($F=63.27$; $p=.000$), indicating that the amount of risk reduced is different for teams versus seniors working individually.

Panel C ANOVA for Individual Senior Versus Team Processing.

	<i>df</i>	<i>Sum of Squares</i>	<i>F-statistic</i>	<i>p-value</i>
<i>Between Factors</i>				
INDUSTRY	1	3,289.50	11.66	0.001
TASKPAIR	1	9,722.37	34.45	0.000
INDUSTRY x TASKPAIR	1	312.50	1.11	0.296
Error (Team/Industry, Taskpair)	68	19,191.20		
<i>Within Factors</i>				
PROCMODE	1	16,300.15	63.27	0.000

PROCmode x INDUSTRY	1	537.19	2.09	0.153
PROCmode x TASKPAIR	1	87,733.95	340.55	0.000
PROCmode x INDUSTRY x TASKPAIR	1	3,289.50	12.77	0.001
Error(Procmode x Team/ Industry, Taskpair)	68	257.62		.
ERRTYPE	1	9,187.65	26.77	0.000
ERRTYPE x INDUSTRY	1	39.50	0.12	0.736
ERRTYPE x TASKPAIR	1	4,944.59	14.41	0.000
ERRTYPE x INDUSTRY x TASKPAIR	1	312.50	0.91	0.343
Error (Errtype x Team\ Industry, Taskpair)	68	343.22		
PROCmode x ERRTYPE	1	6,448.33	18.10	0.000
PROCmode x ERRTYPE x INDUSTRY	1	2,648.30	7.39	0.008
PROCmode x ERRTYPE x TASKPAIR	1	7,743.20	21.61	0.000
PROCmode x ERRTYPE x INDUSTRY x TASKPAIR	1	298.76	0.83	0.364
Error (Procmode x Errtype x Team/ Industry, Taskpair)	68	358.38		

Panel B of Table 4-3 indicates that while seniors detected 21.96 percent of the total errors, working individually, teams detected 37.02 percent of the errors. An examination of PROCmode X ERRTYPE in Panel C is also significant($F=18.01$; $p=.000$) indicating that the types of error detected by seniors working individually and

teams are different. Again, Panel B Table 4-3 shows that teams detected 37.92 percent of mechanical errors versus 32.36 percent detected by seniors across the two industries. A simple effects test indicated that this difference was not significant ($F = 0.87$; $p = .354$). In contrast, teams detected 36.11 percent of conceptual errors compared to 11.57 percent detected by seniors. A simple effects test indicates that the difference was significant ($F = 28.86$; $p = .000$).⁴⁶

The Role of Industry Specialization Hypotheses

Hypotheses 2: In Specialization versus Out of Specialization Processing

Hypothesis 2 examines whether there are industry specific advantages in reducing risk. H2 predicted that auditors will reduce more risk working in their specializations than when working out of their specializations. H2 was examined by comparing the amount of risk reduced by both healthcare and banking auditors working in specializations to that reduced when they are working out of specializations. The dependent variables are RR_{SIM} , RR_{SIC} , RR_{STM} , RR_{STC} , RR_{MIM} , RR_{MIC} , RR_{MTM} , and RR_{MTC} . H2 was tested by examining PROCMODE \times TASKPAIR interaction term⁴⁷ which was described in Figure 3-4 as the main effect of IN versus OUT of specialization.

⁴⁶ This interaction suggests that teams are not better in detecting more mechanical errors than seniors working individually, but teams are significantly in detecting more conceptual errors than seniors working individually.

⁴⁷ In addition to Figure 3-4, the contrast coded design shown in Figure 3-3 indicates that the main effect of IN versus OUT of specialization is the interaction of TASKPAIR \times PROCMODE. The TASKPAIR \times PROCMODE interaction is best understood as the pairing of tasks in which each auditor performed tasks as individual and then as a part of team. The diagonals of this interaction test IN specialization; off diagonals test out of specialization.

The result of the full ANOVA model using only mechanical and conceptual errors is shown in Panel A of Table 4-4. The results indicate a significant interaction of PROCMODE x TASKPAIR ($F=469.79$; $p=.000$) suggesting a large reduction of risk when the auditors work in their specializations versus out of specialization.

TABLE 4-4
Test of Hypothesis 2- In Specialization Versus Out of specialization
Results of Repeated Measures ANOVA

MODEL: RR_{SIM} , RR_{SIC} , RR_{STM} , RR_{STC} , RR_{MIM} , RR_{MIC} , RR_{MTM} , and RR_{MTC} = INDUSTRY, TASKPAIR, LEVEL, PROCMODE

Panel A Risk Reduction: The Effect of IN Specialization Versus Out of Specialization

<i>Between Factors</i>	<i>df</i>	<i>Sum of Squares</i>	<i>F Statistic</i>	<i>p-value</i>
INDUSTRY	1	0.0009	0.19	0.660
TASKPAIR	1	0.0316	6.60	0.013
ORDER	1	0.0010	0.21	0.646
INDUSTRY x TASKPAIR	1	0.0001	0.01	0.905
INDUSTRY x ORDER	1	0.0001	0.02	0.889
TASKPAIR x ORDER	1	0.0046	0.97	0.329
INDUSTRY x TASKPAIR x ORDER	1	0.0003	0.07	0.795
Error	64	0.3065		
<i>Within Factors</i>				
LEVEL	1	0.1771	56.83	0.000
LEVEL x INDUSTRY	1	0.0002	0.05	0.824
LEVEL x TASKPAIR	1	0.0139	4.47	0.038
LEVEL x ORDER	1	0.0000	0.00	1.000
LEVEL x INDUSTRY x TASKPAIR	1	0.0001	0.18	0.674
LEVEL x INDUSTRY x ORDER	1	0.0000	0.00	0.961

LEVEL x TASKPAIR x ORDER	1	0.0004	0.12	0.729
LEVEL x INDUSTRY x TASKPAIR x ORDER	1	0.0001	0.02	0.882
Error	64	0.1995		
PROCMODE	1	0.0136	3.23	0.077
PROCMODE x INDUSTRY	1	0.0000	0.00	0.966
PROCMODE x TASKPAIR	1	1.8830	446.42	0.000
PROCMODE x ORDER	1	0.0001	0.02	0.882
PROCMODE x INDUSTRY x TASKPAIR	1	0.0336	7.97	0.006
PROCMODE x INDUSTRY x ORDER	1	0.0016	0.38	0.537
PROCMODE x TASKPAIR x ORDER	1	0.0003	0.08	0.782
PROCMODE x INDUSTRY x TASKPAIR x ORDER	1	0.0006	0.13	0.717
Error	64	0.2700		
ERRTYPE	1	0.7559	214.86	0.000
ERRTYPE x INDUSTRY	1	0.0100	2.84	0.097
ERRTYPE x TASKPAIR	1	0.0022	0.63	0.429
ERRTYPE x ORDER	1	0.0009	0.24	0.625
ERRTYPE x INDUSTRY x TASKPAIR	1	0.0001	0.02	0.889
ERRTYPE x INDUSTRY x ORDER	1	0.0024	0.67	0.416
ERRTYPE x TASKPAIR x ORDER	1	0.0000	0.00	0.981
ERRTYPE x INDUSTRY x TASKPAIR x ORDER	1	0.0003	0.09	0.762
Error	64	0.2252		

LEVEL x PROCMODE	1	0.0133	4.12	0.047
LEVEL x PROCMODE x INDUSTRY	1	0.0000	0.01	0.903
LEVEL x PROCMODE x TASKPAIR	1	0.0564	17.49	0.000
LEVEL x PROCMODE x ORDER	1	0.0011	0.34	0.559
LEVEL x PROCMODE x INDUSTRY x TASKPAIR	1	0.0000	0.01	0.942
LEVEL x PROCMODE x INDUSTRY x ORDER	1	0.0000	0.01	0.922
LEVEL x PROCMODE x TASKPAIR x ORDER	1	0.0001	0.04	0.846
LEVEL x PROCMODE x INDUSTRY x TASKPAIR x ORDER	1	0.0017	0.54	0.466
Error	64	0.2064		
LEVEL x ERRRTYPE	1	0.1545	37.13	0.000
LEVEL x ERRRTYPE x INDUSTRY	1	0.0238	5.71	0.020
LEVEL x ERRRTYPE x TASKPAIR	1	0.0032	0.78	0.381
LEVEL x ERRRTYPE x ORDER	1	0.0004	0.09	0.764
LEVEL x ERRRTYPE x INDUSTRY x TASKPAIR	1	0.0012	0.29	0.592
LEVEL x ERRRTYPE x INDUSTRY x ORDER	1	0.0106	2.54	0.116
LEVEL x ERRRTYPE x TASKPAIR x ORDER	1	0.0084	2.02	0.160
LEVEL x ERRRTYPE x INDUSTRY x TASKPAIR x ORDER	1	0.0011	0.27	0.607
Error	64	0.2663		
PROCMODE x ERRRTYPE	1	0.0178	5.11	0.027

PROCMode x ErrType x Industry	1	0.0037	1.07	0.304
PROCMode x ErrType x TaskPair	1	0.4117	118.24	0.000
PROCMode x ErrType x Order	1	0.0000	0.03	0.870
PROCMode x ErrType x Industry x TaskPair	1	0.0741	21.28	0.000
PROCMode x ErrType x Industry x Order	1	0.0032	0.93	0.338
PROCMode x ErrType x TaskPair x Order	1	0.0000	0.01	0.907
PROCMode x ErrType x Industry x TaskPair x Order	1	0.0009	0.24	0.623
Error	64	0.2229		
Level x ProcMode x ErrType	1	0.0082	2.41	0.126
Level x ProcMode x ErrType x Industry	1	0.0000	0.00	0.981
Level x ProcMode x ErrType x TaskPair	1	0.0689	20.35	0.000
Level x ProcMode x ErrType x Order	1	0.0001	0.02	0.887
Level x ProcMode x ErrType x Industry x TaskPair	1	0.0026	0.78	0.381
Level x ProcMode x ErrType x Industry x Order	1	0.0025	0.74	0.393
Level x ProcMode x ErrType x TaskPair x Order	1	0.0000	0.01	0.924
Level x ProcMode x ErrType x Industry x TaskPair x Order	1	0.0079	2.33	0.132
Error	64	0.2167		

Panel B of Table 4-4 presents the means for the amount of risk reduced by auditors working in their specialization versus out of specialization. As shown, auditors working in their specialization reduced more risk (35.08%) than auditors working out of their specialization (9.35 %). Specifically, auditors working in their specialization reduced 79.13 percent of the combined risk and auditors working out of their specialization reduced 20.86 percent of the risk working in their specialization and out of their specialization. When the reduced risk was segregated into each individual versus team processing modes, the observed pattern of better risk reduction by In-specialization versus out of specialization auditors persists. For example, individuals and teams working in their specialization reduced more risk (82.26 and 76.27 percent respectively) than individuals and teams working out of their specialization (17.74 and 23.73 percent respectively).

The Interactive Role of Review Hierarchy, Specialization, and
Processing Mode on Risk Reduction

H4 (a) and H4(b): The Joint Role of General Experience, In versus Out of
Specialization and Processing Mode on Risk Reduction

Hypothesis 4(a) and H4(b) are the main hypotheses in this study. Hypothesis 4(a) predicted that as the level of review hierarchy increases, specialized teams working in their specialization will reduce more risk than specialized individual auditors (managers or seniors) working individually. Hypothesis 4(b) predicts that as the level of review hierarchy increases, specialized teams working out of their specialization will reduce more risk than specialized individual managers or seniors auditors working out their specialization.

Panel B Means of Risk Reduction in In-specialization Versus Out of specialization by Processing Mode

<i>Taskpair</i>	<i>Procmode</i>		
	<i>All Errors</i>	<i>Individual</i>	<i>Review Team</i>
<i>IN-Specialization</i>	35.08 (79.13%)*	28.92 (76.27%)	41.25 (82.26%)
<i>OUT of Specialization</i>	9.25 (20.86)	9.00 (23.73)	9.49 (17.74)
<i>Total Reduced Risk</i>	44.33 (100)	37.92 (100)	50.74 (100)

* The numbers in the bracket are percentages of the total risk in each column⁴⁸

⁴⁸ The data used for the individual level of processing mode are the average of the sum of seniors and managers mean scores, working individually since this test purely individual versus team processing.

The percentage is calculated by dividing the risk reduced by In-specialization auditors into the total risk reduced by both In-specialization and Out of Specialization auditors $79.13\% = (35.08/44.33)$

The results in Panel B were further dis-aggregated into the error types detected in versus out of specialization. Although this analysis is not required in testing hypothesis H2, it is presented below so as to shed a complete light on the effects of risk reduction due to error types in versus out of specialization. The data in each column were pooled over the scores of the senior, manager, and team. As shown, auditors working in their specialization reduced more mechanical error risk (80.53 %) than auditors working out of their specialization (19.47 %). Similarly, auditors working in their specialization reduced more conceptual error risk (65.55 %) than auditors working out of their specialization (35.35%).

<i>TaskPair</i>	<i>Error Types</i>		
	<i>All Errors</i>	<i>Mechanical</i>	<i>Conceptual</i>
<i>IN-Specialization</i>	33.02 (78.27%)	21.85(80.53%)	11.17 (65.55%)
<i>OUT of Specialization</i>	9.17 (21.73)	5.28 (19.47)	5.89 (35.45)
<i>Total Reduced Risk</i>	42.19 (100)	27.13 (100)	17.06 (100)

Hypothesis 4(a) and H4 (b) are tested jointly by examining the interaction of LEVEL x TASKPAIR. This interaction term was described in Figure 3-4 as testing the interaction of IN or OUT of specialization with LEVEL x PROCMODE. Further, TASKPAIR was described in Figure 3-4 as testing the interaction of PROCMODE with IN/OUT of specialization.⁴⁹ Thus, the LEVEL x TASKPAIR interaction term tests whether that interaction differs by level or more specifically, whether the amount of risk reduced changes differently depending on general audit experience, processing mode, and industry specialization. The dependent variables are the proportions of errors detected by teams (RR_{MTM} , RR_{MTC}), managers working individually (RR_{MIM} , RR_{MIC}) and seniors⁵⁰ working individually (RR_{SIM} , RR_{SIC}).

The repeated measures ANOVA results presented in Panel A of Table 4-5 indicates that LEVEL x TASKPAIR interaction is highly significant ($F=207.60$; $p=0.000$). This suggests that risk reduction due to the effect of industry specific knowledge is different as the level of review hierarchy increases and this difference depends upon

⁴⁹ The experimental design contrast coding presented in Figure 3-3 and described in Figure 3-4 indicates that the main effect of TASKPAIR tested the interaction of PROCMODE with IN/OUT of specialization

⁵⁰ Only the error scores for the senior in the “individual” condition were included in this analysis since there is no significant difference in the individual senior versus team seniors’ scores. By including only one level of the “individual” seniors’ scores, equal number of units in each cell is guaranteed. This is because the “team” or “individual” senior in the experiment both performed the same identical tasks individually using identical set of instructions. The only difference between the two groups is that the researcher designated for review, the scores of the “team seniors” but not the scores of the “individual” seniors. For this analysis, the modified variable LEVEL has three levels to reflect Managers in team (RR_{MTM} , RR_{MTC}), Managers working individually (RR_{MIM} , RR_{MIC}) and Seniors working individually (RR_{SIM} , RR_{SIC}).

whether auditors are working individually or as a part of a team in their specialization versus out of their specialization.

In contrast, as review hierarchy increases, managers working out of their specialization detected more errors (10.55 percent) than teams working out of their specialization (9.49 percent) but a simple effects test for the difference is not significant ($F=0.34; F=0.58$). However, teams working out of their specialization detected more errors (9.49 percent) than seniors working out of their specialization (7.45 percent). The simple effect test on the difference is not significant ($F=1.98; p=.168$). Thus, hypothesis 4(b) is not confirmed. This suggests that as the review hierarchy increases, teams working out of their specializations are not better in reducing risk than individuals (managers or seniors).

TABLE 4-5
Test of Hypothesis 4-The interaction Effect of Experience, Industry Specialization and Processing Mode
Results of Repeated Measures ANOVA

MODEL: $RR_{SIM}, RR_{SIC}, RR_{STM}, RR_{STC}, RR_{MIM}, RR_{MIC}, RR_{MTM},$ and $RR_{MTC} = INDUSTRY,$
TASKPAIR, LEVEL, ERRTYPE

Panel A *Risk Reduction: The Joint Effect of General Audit Experience and, Industry Specialization*

<i>Between Factors</i>	<i>df</i>	<i>Sum of Squares</i>	<i>F Statistic</i>	<i>p value</i>
INDUSTRY	1	0.0007	0.16	0.692
TASKPAIR	1	0.0195	4.16	0.046
ORDER	1	0.0016	0.34	0.560
INDUSTRY x TASKPAIR	1	0.0043	0.92	0.340

INDUSTRY x ORDER	1	0.0003	0.07	0.797
TASKPAIR x ORDER	1	0.0032	0.67	0.415
INDUSTRY x TASKPAIR x ORDER	1	0.0001	0.01	0.907
Error (Team / Industry, Taskpair)	64	0.2995		
<i>Within Factors</i>				
LEVEL	2	0.1454	18.76	0.000
LEVEL x INDUSTRY	2	0.0002	0.03	0.973
LEVEL x TASKPAIR	2	1.6088	207.60	0.000
LEVEL x ORDER	2	0.0006	0.08	0.927
LEVEL x INDUSTRY x TASKPAIR	2	0.0205	2.64	0.075
LEVEL x INDUSTRY x ORDER	2	0.0013	0.17	0.844
LEVEL x TASKPAIR x ORDER	2	0.0008	0.10	0.903
LEVEL x INDUSTRY x TASKPAIR x ORDER	2	0.0021	0.27	0.760
Error(Level x Team/Taskpair, Industry)	128	0.4960		
ERRTYPE	1	0.3932	98.76	0.000
ERRTYPE x INDUSTRY	1	0.0130	3.26	0.076
ERRTYPE x TASKPAIR	1	0.0415	10.42	0.002
ERRTYPE x ORDER	1	0.0009	0.23	0.631
ERRTYPE x INDUSTRY x TASKPAIR	1	0.0022	0.54	0.464
ERRTYPE x INDUSTRY x ORDER	1	0.0002	0.05	0.820
ERRTYPE x TASKPAIR x ORDER	1	0.0007	0.19	0.667
ERRTYPE x INDUSTRY x TASKPAIR x ORDER	1	0.0000	0.02	0.899
Error(Errtype x Team/Industry, Taskpair)	64	0.2548		

LEVEL x ERRTYPE	2	0.0585	15.06	0.000
LEVEL x ERRTYPE x INDUSTRY	2	0.0245	3.16	0.046
LEVEL x ERRTYPE x TASKPAIR	2	0.2445	31.48	0.000
LEVEL x ERRTYPE x ORDER	2	0.0004	0.06	0.946
LEVEL x ERRTYPE x INDUSTRY x TASKPAIR	2	0.0664	8.55	0.000
LEVEL x ERRTYPE x INDUSTRY x ORDER	2	0.0132	1.70	0.186
LEVEL x ERRTYPE x TASKPAIR x ORDER	2	0.0058	0.74	0.478
LEVEL x ERRTYPE x INDUSTRY x TASKPAIR x ORDER	2	0.0096	1.24	0.293
Error (Level x Errtype x Team/Industry, Taskpair)	128	0.4973		

An examination of Panel B of Table 4-5 indicates that as we move from the senior to the manager level in the team hierarchy, review teams detect more errors (41.25)

To further explore the differences in the reduction of risk, the results were analyzed with respect to mechanical versus conceptual errors. The LEVEL x ERRTYPE x TASKPAIR interaction term examined the level of risk reduced as the level of hierarchy increases (from senior level to manager) and when auditors work in their specialization and out of their specialization, either as individuals or as part of teams. As shown in Panel A of Table 4-5, the LEVEL x ERRTYPE x TASKPAIR interaction is significant ($F=31.48$; $p=0.000$) indicating that mechanical versus conceptual errors were detected differently, at different hierarchy levels, and depending upon whether auditors were working in or out of their specializations or as individual versus as a team.

Panel B: Means of Risk reduced by Individuals and Teams by Taskpair and Review Hierarchy⁵¹

<i>Variable</i>	<i>Taskpair</i>			
	<i>In-Specialization</i>		<i>Out of Specialization</i>	
	<i>Individual</i>	<i>Team</i>	<i>Individual</i>	<i>Team</i>
<i>Review Hierarchy (LEVEL)</i>	<i>All Errors Types</i>	<i>All Errors Types</i>	<i>All Error Types</i>	<i>All Error Types</i>
<i>Seniors</i>	25.37	26.38	7.45	6.48
<i>Managers</i>	32.46	41.25	10.55	9.49

An examination of the means in Panel C of Table 4-5 shows that as the level of hierarchy increases, teams working *in* their specialization reduced more risk due to mechanical and conceptual errors (25.56 and 15.69 percent respectively) than managers working individually (18.43 and 14.03 percent risk respectively). The simple effect test

⁵¹ The data in Panel B is presented differently by showing data for both In and Out of specialization scenarios side by side for individual versus team processing.

Means of Risk Reduced by Individuals and Teams by Review Hierarchy and Taskpair

<i>Variable</i>	<i>Processing Mode</i>			
	<i>Individual</i>		<i>Review Team</i>	
	<i>In Specialization</i>	<i>Out of Specialization</i>	<i>In Specialization</i>	<i>Out of Specialization</i>
	<i>All Errors Types</i>	<i>All Error Types</i>	<i>All Errors Types</i>	<i>All Error Types</i>
<i>Seniors</i>	25.37	7.45	26.38	6.48
<i>Managers</i>	32.46	10.55	41.25	9.49

of this difference is significant for only the risk reduced due to mechanical errors ($F=12.15$, $p=.001$) but not for risk reduced due to conceptual errors ($F=.89$, $p=.352$).

This suggests that as the review hierarchy increases, teams are better able to detect mechanical errors but not conceptual errors than managers when they both work in their specialization.

In contrast, as the level of the review hierarchy increases, teams in their specialization do not significantly reduce more risk that are due to mechanical errors than seniors (25.56 versus 22.57). However, teams reduce more risk than seniors in conceptual errors (15.69 versus 4.03).

Panel C Means* of Risk Reduced by Individuals and Teams by Review Hierarchy and Taskpair

Review Hierarchy	TASKPAIR							
	In Specialization				Out Of Specialization			
	Individual	Team	Individual	Team	Individual	Team	Individual	Team
	Mechanical Error	Mechanical Error	Conceptual Error	Conceptual Error	Mechanical Error	Mechanical Error	Conceptual Error	Conceptual Error
Seniors	21.57	22.36	3.80	4.03	5.00	4.95	2.45	1.53
Managers	18.43	25.56	14.03	15.69	5.18	5.65	5.37	3.84

* The means in this table are scores based on the proportion of total risk reducible. Total risk reducible consists of risk due to mechanical, conceptual and mixed errors. In this study, only mechanical and conceptual error risks are examined. If the means in this Table were based on only the sum of the mechanical and conceptual scores, then seniors scores in column 1 will be 31% (((0.2157 x 22)/15)), see Table 5-5)).

Panel D below presents the information in Panel C in a different way by showing the results by Review Hierarchy and Processing Mode.

Panel D Means of Risk Reduced by Individuals and Teams by Review Hierarchy and Taskpair

Review Hierarchy	Processing Mode							
	Individual				Team			
	In Specialization		Out Of Specialization		In Specialization		Out Of Specialization	
	Mechanical Error	Conceptual Error	Mechanical Error	Conceptual error	Mechanical Error	Conceptual error	Mechanical Error	Conceptual error
Seniors	21.57	3.80	5.00	2.45	22.36	4.03	4.95	1.53
Managers	18.43	14.03	5.18	5.37	25.56	15.69	5.65	3.84

The Perceived Risk of Misstatements

H5: The Effect of Work Paper Review on the Reviewers' Perceived Risk of Material Misstatement

Hypothesis 5 examines how the reviewer's assessment of the perceived risk of material misstatements in work papers prepared by the subordinate changed between his or her pre-review and post-review of the work papers during an audit. The dependent variables are the perceived risk reduction (PRR) difference scores between the pre and post ratings for (1) individual seniors who rated the staff's work (PRR_{SI}), (2) individual seniors working as a part of a team who rated the staff's work (PRR_{ST}), (3) individual managers who rated staff's work (PRR_{MI}), and (4) team managers who rated the team senior's work, (PRR_{SI}).⁵²

H5 was analyzed using two methods. The first involved examining the result of a Paired T test analysis on the difference scores at each auditor level. Table 4-6 presents the results of the paired T test. An observation of Table 4-6 shows that the difference scores for (1) individual seniors who rated staff's work (PRR_{SI}) is significant ($t=9.37$; $p=.000$), (2) individual seniors working as a part of a team who rated staff's work (PRR_{ST}) is significant ($t=7.23$; $p=.000$), (3) individual managers who rated staff's work (PRR_{MI}) is significant ($t=6.62$; $p=.000$), and (4) team managers who rated team senior's work in the team (PRR_{SI}) is also significant ($t=3.72$; $p=.000$). These results together indicate that the

⁵² The team manager rated a team senior's work, the team senior reviewed the staff's work before being reviewed by the team manager.

reviewer's perceived risk of misstatements was significantly reduced after reviewing the work of the subordinate. Thus H5 is confirmed.

TABLE 4-6
Test of Hypothesis 5-Reviewer's Perceived Risk

PANEL A: *Paired T test and Means of Difference Score between Pre and Post Rating of Perceived Risk of Material Misstatement in a Subordinate's work*

<i>Assessed Perceived Risk</i>	<i>Team Managers Rates Senior (PRR_{MT})</i>	<i>Team Senior Rates Staff ((PRR_{ST})</i>	<i>Manager Rates Staff (PRR_{MI})</i>	<i>Senior Rates Staff (PRR_{SI})</i>
Pre-review	61.26 (21.97)	61.51	64.05 (22.08)	63.97 (18.30)
Post-review	44.14 (26.44)	38.22	36.17 (28.01)	38.14 (24.37)
Difference Score	17.12 (3.57)	23.29 (3.20)	27.87 (4.21)	25.83 (2.75)
t-statistic	4.79	7.23	6.62	9.57
p-value	0.000	0.000	0.000	0.000

The second test involves conducting a repeated measures ANOVA on the difference scores for the seniors, managers and teams. This analysis examines whether the level of assessed perceived risk, before and after the review, depended upon (1) the experienced of, (2) whether one is working in one's industry or not, or (3) working as an individual or as a team. The repeated variables are LEVEL and PROCMODE and the between factors are INDUSTRY and TASKPAIR. The results are presented in Panel B of Table 4-6 and they indicate a significant main effect for PROCMODE ($F=5.77$; $p=0.019$). This indicates that there is a difference in the level of perceived risk reduced when auditors are working individually or as part of a team. Planned comparison

analyses were performed to examine the significance of the difference scores means (1) between team managers who rated the team senior's work and the individual managers who rated staff's work, (2) between individual managers and seniors who both rated the staff's work, and (3) between team managers who rated the team senior's work and individual seniors who rated staff's work on the same cases.

*Panel B Result of Repeated Measures ANOVA on Perceived Risk Reduction
Difference Scores for Pre and Post Perceived Risk Assessment*

Test of H5

MODEL: $PRR_{MT}, PRR_{MA}, PRR_{SA}, PRR_{ST} = \text{INDUSTRY, TASKPAIR, LEVEL, PROCMODE}$

<i>Between Factors</i>	<i>df</i>	<i>Sum of Squares</i>	<i>F-Statistics</i>	<i>p value</i>
INDUSTRY	1	1,498.78	1.18	0.281
TASKPAIR	1	222.25	0.18	0.68
ORDER	1	191.75	0.15	0.699
INDUSTRY x TASKPAIR	1	79.17	0.06	0.804
INDUSTRY x ORDER	1	140.28	0.11	0.741
TASKPAIR x ORDER	1	750.78	0.59	0.445
Error	65	82,509.45		
Within Factors				
LEVEL	1	306.28	0.25	0.622
LEVEL x TASKPAIR	1	2,216.67	1.77	0.188
LEVEL x INDUSTRY	1	366.75	0.29	0.59
LEVEL x ORDER	1	129.34	0.10	0.749
LEVEL x INDUSTRY x TASKPAIR	1	621.28	0.50	0.483
LEVEL x INDUSTRY x ORDER	1	0.00	0.00	0.999

LEVEL x TASKPAIR x ORDER	1	669.17	0.54	0.467
ERROR (LEVEL)	65	81,212.25		
PROCMODE	1	3,180.03	5.77	0.019
PROCMODE x TASKPAIR	1	323.00	0.59	0.447
PROCMODE x INDUSTRY	1	0.42	0	0.978
PROCMODE x ORDER.	1	514.67	0.93	0.337
PROCMODE x INDUSTRY*TASKPAIR	1	1,373.75	2.49	0.119
PROCMODE x INDUSTRY x ORDER	1	1,046.53	1.9	0.173
PROCMODE x TASKPAIR x ORDER	1	816.75	1.48	0.228
Error (PROCMODE)	65	35,823.59		
LEVEL x PROCMODE	1	1,212.78	2.34	0.131
LEVEL x PROCMODE x TASKPAIR	1	700.00	1.35	0.25
LEVEL x PROCMODE x INDUSTRY	1	1,008.75	1.94	0.168
LEVEL x PROCMODE x ORDER	1	27.50	0.05	0.819
LEVEL x PROCMODE x INDUSTRY x TASKPAIR	1	530.84	10.2	0.316
LEVEL x PROCMODE x INDUSTRY x ORDER	1	964.34	1.86	0.178
LEVEL x PROCMODE x TASKPAIR x ORDER	1	225.78	0.43	0.51
ERROR	65	33,752.75		

Panel C of Table 4-6 presents the results of the planned analysis which show that the magnitude of team's assessed PRR is significantly different from that of individual managers ($F=6.67$; $p=.012$). Teams did not adjust the level of their reduced perceived risk as large as managers who worked individually. For example, of the magnitude teams pre and post risk reduction was 17.12 percent while the magnitude of individual seniors' pre and post risk reduction is 27.87. This suggests that individual managers who rated their level of perceived risk after reviewing only the work of staff also believe that their review reduced more risk than that of the team managers who rated perceived risk of material misstatements on a team senior's work, even though the team senior had previously reviewed the work of the staff.

Likewise, the magnitude of the individual audit seniors' pre and post risk reduction after reviewing the work of the staff work is larger than that of the team, although the difference is marginally significant ($F= 3.35$; $p=.071$). This indicates that seniors believe that their review of the staff work also reduced more risk than reduced by team manager who previously reviewed a team senior. Again, the magnitude of the teams mean difference score is only 17.12 percent while that of the team senior's is 25.83 percent.

Panel C presents the results of planned comparisons. The analysis of the magnitude of the perceived risk reduced by managers and seniors after the review of a staff is not significant ($F=0.20$; $p=.654$). These results indicate that managers and seniors both perceived the risk of material misstatements remaining after the review of a staff to be similar. The results also show that individuals overestimate their abilities and

Panel C: Planned Comparisons of Means

<i>Difference Scores</i>	<i>F-Statistics</i>	<i>P-value</i>
PRR_{MT} Versus PRR_{MI}	6.67	0.012
PRR_{MT} Versus PRR_{SI}	3.35	0.071
PRR_{MI} Versus PRR_{SI}	0.20	0.654

potentials. This is evidenced by the near identical magnitude of reduced perceived risk by managers (27.87) and seniors is (25.83).

CHAPTER 5

SUMMARY AND DISCUSSION OF RESULTS

This chapter summarizes and discusses the results of the study. The first section summarizes the findings. The second section discusses the results relating to general experience or the level of the auditor in the review team, the role of individual versus group processing, and the role of industry specialization on auditors ability to detect errors. The third section discusses the implication of the study and the last section focuses on future research on the review process.

Summary of Results

Table 4-1 summarizes the results for the hypotheses using the full model. General experience and general audit knowledge are essential to detecting more material misstatements. Audit seniors detected more *mechanical* errors than managers, managers detected more *conceptual* errors than seniors working individually or as part of a team as hypothesized in H1.

Teams are generally better at reducing risk than individuals (H3). This is consistent even for teams that are working outside their specialization. Review teams detected more conceptual errors than individuals working alone, however, review teams do not significantly detect more misstatements than individuals (e.g manager) when working out of specialization.

Industry specialization helps specialized teams to reduce more risk. Specialized teams reduced more risk in their specialization than out of their specialization as hypothesized in H2. Further, as the hierarchy of the team members increases, the advantage of industry specialization also increases. In this study, the advantages increased more for teams working in specialization than for individuals working in or out of specialization. This result raises the issue of synergy and additive effect of sequential-hierarchical review.

Discussion of Results

The results show that there is general audit experience or level of review advantage in reducing the risk of misstatements. This was evidenced by the higher means of the managers versus the seniors. However, this advantage arises because managers are able to detect more conceptual errors than seniors, whereas seniors have the advantage in detecting mechanical errors. This finding is consistent with Ramsay (1994) and Bamber and Ramsay (1997) and it implies that lower level auditors focus more on the mechanical errors since they perform the most detailed part of the audit while managers focus more on the judgmental or conceptual parts of the audit.

The advantage of the manager over the senior in reducing risk generally holds across the two industries, however this advantage decays significantly when teams and individuals work out of their specialization and the tasks involve specific errors. While there is still significant experience effect between the manager and senior as indicated previously, teams working out of their specialization are not significantly better than managers working individually out of specialization. This suggests that teams or

individuals working out of their specializations experience a ceiling effect since, they do not have the unique industry experience to effectively perform industry related tasks. This ceiling effect holds at both individual and team levels. This evidence further demonstrates the importance of industry knowledge.

General Discussion.

The sequential- hierarchical review process seems to be effective at reducing the risk of material misstatements as demonstrated by the significantly higher means of the review teams than those of the manager or senior working individually. This advantage is not industry specific since managers or senior working individually also reduced less risk when compared with the review team within a particular industry specialization. The evidence that the review team is not significantly better than the manager when the teams are working out of their specialization is also very intuitive. Because auditors working out of their area of specialization do not possess the requisite knowledge of the industry tasks outside of their area of expertise, their performance in or out of specialization tasks is likely to depend upon the realm of knowledge ceiling for all non industry specialists in a particular industry. Thus, teams working out of their specializations do not significantly perform better than individual such as the manager.

Is the review process effective at detecting misstatements? Although the sequential-review process is effective in detecting misstatements in a subordinate's working papers, the question of whether the review process is, itself, effective remains a central issue. On average, the review process detected 41 percent (mechanical and conceptual errors only) of the errors in their specialization and only 10 percent of the

same error types working out of their specializations. While the evidence reported in this study suggests that the sequential-hierarchical review may be effective at detecting misstatements not previously detected by the subordinate, the review process itself is not effective in detecting all the misstatements in the working paper. The ineffectiveness of the review process is more pronounced when auditors work out of their specialization since the review process reduced only 10 percent when working out of specialization.

Implications for Audit Practice

One question about the sequential hierarchical review process has been whether it works as a result of pure luck? The evidence in this dissertation helps answer that question by examining the review process for teams working in their specialization and teams working out of their specialization. Since audit teams in their specialization significantly reduced risk more than teams outside of their specialization, the sequential-hierarchical review process seems to work. However, caution should be exercised since the review process itself does not detect all of the errors in a given task. Audit firms may continue to use the different methods of reducing the risk of misstatements as is currently being used or devise other methods that can more accurately detect more misstatements in a given task. One method may include focusing on the multidimensional aspects of errors during the audit process.

Further, there is a huge advantage in industry specialization. This advantage is greater in tasks that may have large amount of potential misstatements, for example, problem audits. In this situation industry specialization creates an atmosphere for the greater display of synergy when the audit manager in a team is likely to compensate for

the inadequacies of the senior in detecting more conceptual and mechanical errors than when the manager is working individually. On the cost side, the review process may be effective in minimizing costs since lower level auditors often work on the details of the audit and higher level auditors work on the conceptual aspects of the audit.

Suggestions for Further Research

Suggestion for further research could focus on how risk reduction would differ under different review specialization schemes. It will be interesting to study the joint effect of task complexity and specialization on risk reduction and note how both may interact to reduce risk. For example, the theory predicts that risk reduction would be larger for complex tasks than for routine tasks, but it is unknown whether this situation will hold when both factors are jointly imposed.

Further research also could examine the issue of whether a good auditor is always a good auditor. This might involve examining the errors scores of seniors with respect to whether those who performed well on the conceptual errors also performed well on the mechanical or mixed errors, and whether the superior performance extends to out of specialization tasks. This performance could then be correlated to how much confidence or reliance managers or reviewer's placed on the work of these auditors in their specialization and out of specialization. Research could also examine how well industry specialist partners are able to predict the true performance of auditors in their specialization versus other auditors who attempt to perform a task out of their specialization. Additionally, research could investigate the extent of knowledge transfer across industries and whether this transfer is related to specific errors.

APPENDIX A CASE INSTRUMENT

Hospital Case

Dear Participant:

As part of my doctoral program, I am conducting a research study with the help and support of KPMG Peat Marwick through a Doctoral Fellowship. This study, which concerns an examination of the role of the audit review process in detecting material misstatements, is the foundation of my doctoral dissertation at the University of Florida, where it is being supervised by Professor William F. Messier, Jr. In order to investigate this process within the context of industry specialization, the health care and banking industries have been selected.

Should you be willing to participate, the completion of the two booklets (to be found in the two accompanying brown envelopes) should take approximately 60-75 minutes. Please allow approximately half of the time for each booklet. Additional general instructions are presented on the next page, with each booklet containing more specific instructions for completing the review of the case materials contained within that respective booklet. To assure response confidentiality, please do not place your name or any other information on the booklets that would provide a means of identifying you. Only aggregate data is to be provided in the dissertation tables or any subsequent publications.

Please be assured that your participation is completely voluntary, and you may discontinue your participation at any time. While there will be no immediate individual benefits or compensation to you for participating, neither are there any risks. I sincerely hope that you will agree to help me and participate. Your knowledge-based responses are of the utmost importance to this study. Please let me know if I can answer any questions that you have about the study. My telephone numbers are (617)-891-2353 (O) and (617)-552-5014 (H). You may direct any questions that you have about your rights as a participant to UFIRB, P.O. Box 112250, University of Florida, Gainesville, 32611-2250. Please return the completed materials directly to me by (insert date) using the enclosed addressed, stamped envelope.

Sincerely,
Vincent Owoso, Peat Marwick Doctoral Fellow
Department of Accountancy
Bentley College
Waltham, MA 02154

GENERAL INSTRUCTION

Thank you for participating in this study. The study is concerned with the role of the audit review process in detecting material misstatements. The study should take approximately between 60-75 minutes to complete, about half of the time for each booklet. Please do not consult reference materials or other individuals in the process of completing the study.

The study materials are presented in two separate booklets as shown in figure 1. Each booklet contains specific instructions on the requirements for completing the review of the case materials in that booklet.

Booklet 1 relates to the audit of accounts receivable and the allowance for uncollectible accounts of a hospital. You are asked to **review work papers prepared by a staff auditor**. Booklet 2 relates to the audit of loans receivable and the allowance for uncollectible loans or loan loss reserves of a bank. **You are asked to review work papers prepared by a staff auditor**. It is essential that you complete booklet 1 before booklet 2.

You have been selected to participate in this study because you have specialized knowledge in one industry and general knowledge about the other industry. Thank you once again for your participation in this study.

Figure 1

BOOKLET 1- (HOSPITAL CASE)	BOOKLET 2-(BANKING CASE)
Review work papers prepared by a staff auditor .	Review work papers prepared by a staff auditor .
Complete a Post-Study Questionnaire	

BOOKLET 1

Florasville Hospital, Inc.

Assume that Smith and Clyde, CPAs, your employer, has assigned you as the in-charge senior for the current year audit (fiscal year ended December 31, 1996) of Florasville Hospital, Inc. Mary Pender, a second year staff auditor with one year's **healthcare industry** audit experience, has just completed detailed audit tests on Florasville Hospital's accounts receivable and the allowance for uncollectible accounts. Mary Pender submitted the working papers to you for review.

You are asked to complete the following:

1. Read the background information on Florasville Hospital, Inc.
2. Make a preliminary judgment about (a) the likelihood of material misstatements in the financial statements and (b) the likelihood that the **staff auditor** detected such misstatements.
3. (a) Review the working papers which include a partial audit program for accounts receivable, unaudited balance sheet and income statement, and staff auditor's working papers which include a lead sheet, schedules, audit memos, and conclusions.

(b) Prepare any necessary **review notes or comments** using the preprinted workpaper that is provided in this packet.
4. Make a final judgment about (a) the likelihood of material misstatements in the financial statements and (b) the likelihood that the staff auditor detected such misstatements.
5. Complete a post-study questionnaire.
6. You may assume that work papers that are **NOT** included in this packet are properly prepared and references to these working papers are correct.

As the in-charge senior, you are aware that your work may be reviewed by the audit manager.

Floraville Hospital, Inc
Accounts Receivable/Allowance for Doubtful Accounts/Revenue
REVIEW NOTES
FYE 12/31/96

W/P Ref No	REVIEW NOTES

BOOKLET 1

Background Information On Florasville Hospital, Inc.

Company Overview

Florasville Hospital Inc. was incorporated July 30, 1985 as an acute-care hospital with 350 beds. The hospital is located in Florasville, a city of 300,000 people with a large number of retirees and working people. This location is regarded as economically depressed and by state standards, income levels in Florasville are relatively low. The hospital's fiscal year ends on December 31. At the end of 1996, unaudited assets were \$225 million. Total revenues for 1996 were \$420 million. At the end of 1996, net total patient service accounts receivable were approximately \$34.2 million compared to \$30.17 million in 1995.

The hospital renders medical services to patients covered by Medicare, Medicaid, and other sponsors' programs and these constitute 60% of the hospitals volume or revenue. Medical services to patients covered by commercial insurance or self-pay patients constitute 40% of the hospital's volume or revenue. The hospital also provides care to patients who meet certain criteria, without charge, under its charity care policy. The hospital's policy has been to support local Florasville economy as much as possible. The hospital's community treatment program has benefitted many low income residents who do not have adequate health insurance. For instance, one recent case involved a car accident involving a working mother and her two small children. Upon admission to the hospital, the emergency room was made aware that the parents did not have health insurance. Despite this, the hospital and its staff provided all the necessary care and treatment possible at its own expense. Florasville hospital is proud of its long standing commitment to the community. It also knows that no other hospital in the community shares its open door policy.

Smith and Clyde, CPAs are Florasville Hospital's external auditors. The firm has assessed the top management of the hospital to be of high integrity with a good reputation in the community.

Accounts Receivable

Medicare and Medicaid usually pay the hospital on the basis of allowable costs or set rates and it usually takes between 15 to 90 days on average to collect. Commercial insurance accounts take between 30 to 60 days to collect while self-pay patient accounts normally take 90 days or longer.

The hospital installed a new computer and redesigned the patient ledgers two years ago. The hospital believes that the conversion has resulted in the lowest days' accounts receivable outstanding of any hospital in the area. In 1996 and 1995, days' accounts receivable outstanding were 61 and 63 days, respectively while the respective industry averages were 64 and 69 days. Accounts receivable turnover ratios were 5.97 for 1996 and 5.79 for 1995 while the industry turnover ratios were 5.70 for 1996 and 5.29 for 1995.

The Audit Plan

Upon completion of the current year planning memorandum, Smith and Clyde has set the hospital's overall audit risk as high. They based their assessment on the significant decline in the hospital's days' accounts receivable outstanding relative to the industry trends for similar hospitals, especially since the hospital is located in a depressed area. Smith and Clyde are concerned about the hospital's methods for estimating accounts receivable, allowance for uncollectible accounts, and third party payments. Accordingly, the firm has planned to look more closely at the hospital's contractual agreements with third party payors and timing differences issues in revenue recognition. This is to ensure that the hospital is consistent in recording revenues at either billing or at payment.

Smith and Clyde also know that peer review organizations (PRO) and third party payors frequently audit, review, or oversee the kinds of charges or amounts the hospital bills third party payors for the different patient cases and diagnostic related groups (DRG). DRG is a Medicare discharge fixed rate code based on the grouping of patients' illnesses. Patients are grouped into individual categories that are clinically coherent and homogeneous with respect to resource use and a fixed rate code is applied to each DRG category.

Hospitals are required to prepare discharge reimbursements (cost) reports using DRGs when seeking charge reimbursements from Medicare. This is important because Medicare will only pay hospitals only for the DRG contracted amounts. Accordingly, Florasville hospital is reimbursed by Medicare for medical charges based upon a single reimbursement rate for a particular DRG code that applies to all the Medicare patients with the same or similar medical case or grouping.

Regardless of the hospitals' established cost of providing services, hospitals regularly receive reimbursements from Medicare and third party payors for amounts that is less than the hospitals' actual cost of providing the services. This situation occurs because of the contractual arrangements that hospitals entered with the third party payors which stipulate the amounts each hospital is expected to receive as reimbursements for charges, regardless of the hospital's actual cost of providing services. Hospitals normally write down gross patient service revenue to net patient service revenue by the amount that the actual cost of providing services exceeds the contractual amounts expected to be received as reimbursement. Thus, hospitals record their revenues as net patient service revenues, that is, the amount patients are legally obligated to pay and not at the amount the hospital's cost of providing services.

Florasville, like some hospitals in the area, also uses an additional charge reimbursement method. This is called the "prospective payment methods (PPM)." Florasville, uses this method when seeking charge reimbursements HMO, but not Medicare or Medicaid. With the use of the PPM system, the hospital can directly write-off uncollectible HMO charges against net patient service revenue.

With third party payors alone accounting for 60 % of the sources of revenue and commercial insurers and selfpay patients accounting for the rest 40% for Florasville hospital, Smith and Clyde believe that the timing differences in revenue recognition, and other related payor class

issues, collectively, can make the estimation of revenues and of account receivable from third party and other sources problematic and, if not carefully controlled, may cause the financial statements to be misstated.

HHB

Florasville Hospital, Inc.
Balance Sheets
December 31, 1996 and 1995
(in 000s)

	Unaudited 1996	Audited 1995
Assets		
Current Assets:		
Cash and cash equivalents	\$20,000	\$15,210
Patient accounts receivable, net of estimated uncollectibles of \$10,460 in 1996 and \$10,480 in 1995	25,200	22,170
Due from Medicare, Medicaid, other third-party payors	9,000	8,000
Other Assets	10,000	9,000
Total Current assets	<u>\$64,200</u>	<u>\$54,380</u>
Other Assets		
Property and Equipment, net	150,000	152,000
Notes Receivable, noncurrent portion	1,800	4,000
Deferred Charges and Other Assets	9,400	13,000
Total Assets	<u><u>\$225,400</u></u>	<u><u>\$223,380</u></u>
Liabilities and Fund Balance		
Current Liabilities:		
Long-term debt, current portion	\$6,000	\$7,000
Accounts payable	20,000	15,000
Accrued expenses	20,000	15,000
Total current liabilities	<u>\$46,000</u>	<u>\$37,000</u>
Long-term debt, noncurrent portion	46,900	36,380
Other long-term liabilities	2,000	2,000
Total Liabilities	<u>\$94,900</u>	<u>\$75,380</u>
Fund Balance	130,500	148,000
Total Liability and Fund Balance	<u><u>\$225,400</u></u>	<u><u>\$223,380</u></u>

HHR

Floraville Hospital, Inc.
Statement of Revenues and Expenses
December 31, 1996 and 1995

(in 000s)

	1996	1995
Net Patient Service Revenue*	\$417,000	\$400,000
Other revenue	<u>3,000</u>	<u>2,000</u>
Total Net revenue	\$420,000	\$402,000
Expenses:		
Salaries and wages	175,000	155,000
Supplies and Expenses	145,000	151,200
Depreciation and amortization	40,000	35,000
Provision for bad debts	16,800	15,500
Other expenses	<u>18,000</u>	<u>22,000</u>
Total expenses	<u>\$394,800</u>	<u>\$378,700</u>
Income from operations	\$25,200	\$23,300
Nonoperating gains (losses) exclusive of expenditures in support of integrated healthcare delivery system-net	<u>5,000</u>	<u>2,220</u>
Revenue and Gains in excess of expenses and losses	<u>\$30,200</u>	<u>\$25,520</u>

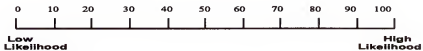
* The current year revenue was reduced by \$5,000,000.

The reduction in net income arose because Medicare notified Floraville Hospital that the hospital overbilled Medicare by \$5,000,000 in the year ended December 31, 1994.

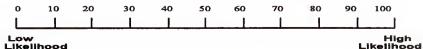
Medicare recently audited Floraville's 1994 cost reports.

Financial Statement and Staff Rating Task.

1. Please rate your overall perceived likelihood that the hospital's accounts receivable and related accounts (e.g allowance for uncollectible accounts) contain a material misstatement. Place an (X) on the scale below to indicate your assessment.



2. If a material misstatement exists in the accounts receivable and related accounts, what is the likelihood that the **staff auditor** detected the material misstatement? Place an (X) on the scale below to indicate your assessment.



Please record the time you begin your review: _____

Florasville Hospital, Inc.
Partial Audit Program
Accounts Receivable and Allowance for Uncollectible Accounts
FYE 12/31/96

Audit Objectives:

1. Adequate allowance is provided for uncollectible accounts and individual patient service receivables, discount arrangements with federal, state, and third party programs are properly valued, and if accounts are charged off previously, the charge-offs are properly recorded.
2. Revenues from services to patients are recorded accurately on accrual basis and properly classified as to type of service rendered, and that receivables and revenues are stated at net realizable value.

Audit Procedures:

	<u>Done By</u>	<u>W/P Ref</u>
1. Evaluate the reasonableness of the allowance for uncollectible accounts. Analyze patient service revenues and accounts receivable as percentage of gross revenues.	MP	HHB, HH H-5, H-5-1
2. Evaluate retroactively determined settlements for Medicare, Medicaid, and other third party contractual arrangements.	MP	H-8
3. Document and analyze how the client estimates the allowance for uncollectible accounts and third party payment.	MP	H-5-1 H-memo-2
a. Look for third party payments, audits, and denials.	MP	HHR
b. Perform retrospective analysis of allowance and rollforward.	MP	H-5-1
c. Test whether accounts receivable is stated at net realizable value.	MP	H-5-1 H-5-2
d. Evaluate and re-estimate the adequacy of reserves for current and prior year.	MP	H-5-1
4. Review working papers and conclude on the reasonableness of accounts receivables and the allowance for uncollectible amounts and contractual adjustments.		

Conclusion: With respect to the set of assertions and related audit procedures, the audit procedures were applied in accordance with firm and professional requirements and objectives.

H-Memo-1
Prepared by: MP
Date: 12/31/96

Florasville Hospital
Memo: Summary of Audit Work Performed-Revenue.
FYE 12/31/96

Purpose:

To determine that all patients were charged for all services performed; that all services were ordered by a physician; and that all similar patients were charged the same charge for the same service.

Tests:

I randomly selected twelve patients from the hospital records, four from the admissions register, four from medical records, and four from the Medicare log. Five of the patients selected were admitted during the test month of September 1996. Three days' charges for each patient were tested, and the room charge for the total stay in the hospital was verified.

Supporting documents examined were medical records, nurses' notes, physicians' orders, patients' accounts, physicians' certifications and re-certifications, and the hospital approved charge schedule.

Three long term stay and one short term stay patients were included in the test. Two of them were Medicare patients. The third was a child Medicaid patient. The first patient, Jodash, spent 75 days in the hospital, the second, Michel, spent 63 days, and the third patient, Jones, spent 72 days. The fourth patient, Malone, spent 6 days before being transferred to a drug and alcohol treatment facility. As in the past, the hospital prepared a cost report for Medicare reimbursement which includes these patients' total medical charges.

During the test, it was noted that both Medicare and non Medicare patients had charges made for services not ordered and conversely some items of service were rendered for which the hospital failed to charge. The effect of such charging errors, on extrapolation, was not deemed material.

It was also noted that the hospital Medicare out-patients paid for all oral prescriptions themselves and the hospital asked for reimbursements from Medicare for all other charges. The hospital felt that the patient should pay for medication that was dispensed orally.

Conclusion:

In my opinion, the hospital's statement of patient service revenue is fairly presented.

H-Memo-2

Prepared by: MP

Date 12/31/96

Florasville Hospital, Inc.

**Memo Re: Reserves, Collection of Account Receivables
and Determination of Bad Debts.**

FYE 12/31/96

Purpose:

To document the methodology for reserve provisions, billing, collection process, and bad debts.

Reserves for Accounts Receivable:

The hospital uses an 18 month window to estimate the bad debt expense for the current month. Based on this data, a current rate is calculated and compared to a historical write-off rate of 4% . The newly calculated rate is then applied to the gross revenue and that amount is written off as bad debts for the current month.

Bad Debts and Collection Efforts:

The collection manager reviews the detailed aged trial balance weekly for each classified payor class for overdue accounts. The weekly review is used for the purpose of sending monthly statements and dunning letters to patients who have not paid to ensure that a specified patient actually exists.

A bad debt edit report is made 45 days after an amount is classified as self-pay or after third party payments have been received. The bad edit report is reviewed weekly by the assistant controller for balances over \$50, which are investigated for true collectibility. If uncollectible, they are put on a bad debt list. This list is reviewed by the collection manager to obtain approval for write off.

An account undergoes several collection stages before it is actually written off. The first stage is pre-collection where an account is sent to the internal collection department if insurance or co-insurance payments have not been received after 45 days since classified. The second stage is when the account is transferred from pre-collection to a collection agency after 105 days since classified. The third stage is the write-off stage where an account with previously noted incomplete documentation and for which no payments have been received after 180 days since transfer to a collection agency is recalled from the collection agency and written off as bad debts.

Conclusion:

The control procedures for reserve provisions, billing, collection process, and bad debts appear to be sufficient to ensure that accounts receivable are properly valued at net realizable value.

HH

Prepared by MP
Date: 12/31/1996

Flordasville Hospital, Inc.
Patient Accounts Receivables
Specified Lead Sheet
FYE 12/31/96
(in 000s)

Account Title/Payer Class	Unadjusted Balance 12/31/96	% of Total	Adjusted Balance 12/31/96	% of Total	Statement Amount 12/31/95	% of Total
Medicare	\$22,060	39	\$22,060	39	\$19,400	39
Medicaid	3,500	6	3,500	6	3,300	7
Commercial	6,800	12	6,800	12	9,500	19
Blue Cross	2,700	5	2,700	5	2,500	5
Indigent	1,700	3	1,700	3	2,100	4
Self-Pay	9,149	16	9,149	16	8,560	17
Others	10,631	19	10,631	19	4,500	9
Total Patient Accounts Receivable	56,540	100	56,540	100	49,860	100
Other Receivable-(H-2)	18,790		18,790		15,590	
Total Accounts Receivable	\$75,330		\$75,330		\$65,450	
Allowance for Uncollectible -see H-5-1, H-5-2	(10,460)		(10,460)		(10,480)	
Allowance for Medicare cont. ad-see H-8	(27,000)		(27,000)		(21,000)	
Allowance for charity- see H-10	(1,070)		(1,070)		(950)	
Allowance for Medicaid -see H-4	(2,500)		(2,500)		(2,550)	
Allowance for indigent Care	(100)		(100)		(300)	
Total allowance for doubtful Accounts	(41,130)		(41,130)		(35,280)	
Net Patient Receivable	\$34,200		\$34,200		\$30,170	

H-5-1

Prepared by: Client

Date: 12/31/1996

**Floridasville Hospital Inc.
Analysis of allowance
deductions
FYE 12/31/96
(in 000s)**

	Unadjusted	Adjusted	
Allowance roll forward:	Balance	Balance	
Beginning Balance	\$10,480	\$10,480	H-6-1
Bad debt exp.	16,800	16,800	H-5-2
Write offs	(20,500)	(16,820)	H-5-2
Ending Balance	<u>\$6,780</u>	<u>\$10,460</u>	

Conclusion:

Financial analysis indicates that client's write-offs are \$16,820, and not \$20,500 as recorded by the client. The client did not object to the adjustment. With this adjustment, the ending balance allowance for uncollectibles is \$10,460. This is consistent with HH.

H-5-2

Prepared: by MP

Date:12/31/1996

Floridasville Hospital**Analysis of allowance for uncollectibles accounts****FYE 12/31/96****(in 000s)****Allowance Rollforward:**

Month	Addition	Write off	Excess	Balance
Balance forward				\$10,480
January	\$1,370	(\$1,060)		10,790
February	1,680	(610)		11,860
March	1,740	(500)		13,100
April	1,720	(1,730)		13,090
May	1,860	(600)		14,350
June	500	(1,040)		13,810
July	1,650	(1,150)		14,310
August	1,400	(460)		15,250
September	200	(100)		15,350
October 1995	800	(1,330)		14,820
November	1,620	(1,030)		15,410
December	2,260	(7,210)		\$10,460
Total	\$16,800	(\$16,820)		
Recoveries		1,210		
Net Write offs		<u><u>(\$15,610)</u></u>		

H-8**Prepared by client****Date: 12/31/1996**

Inpatient	Case	Amount
Discharged-unpaid	2,550	\$38,750
HMO-Inpatient	90	80
Medicare-In house-12/31/96	200	500
Medicare-Suspense	30	120
HMO-In house	45	40
HMO-Suspense	30	50
Number of cases	2,945	\$39,540
Expected Reimbursement		24,160
Contractual Inpatient Receivable		\$15,380

Outpatients

HMO-Unpaid 12/31	\$2,000	
HMO-Unbilled 12/31	1,000	
Medicare-Unpaid at 12/31	5,000	
Medicare- Unbilled 12/31	9,000	
Total out patient	\$17,000	
Contractual % (1-.40) = (0.60)		10,200
Total In/Out patient		\$25,580
Additional Reserve -In/Out patient		1,420
Total Medicare Contractual Adj.		\$27,000

Purpose:

To calculate an allowance for contractual adjustments for Medicare receivable balance so that they are reflected at net realizable value versus gross standard rate at 12/31/96, In order to test the validity and accuracy of the reports used by client to calculate this allowance. I reconciled total Medicare account receivable balance in H-8 to test model on w/p H-7 and they agreed to:

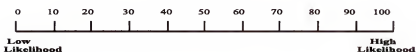
1. The clients' inpatient billed accounts by patient and financial class as at 12/31/96 adjusted for credit balances, zero, and other balances that clearly represent co-payments or deductibles. I recalculated all amounts and case/day.
2. The unbilled discharged inpatient report at 12/31/96,
- 3 In-house inpatient listing by financial or class at 12/31/96.
4. No exceptions were noted.
5. Accounts receivable trial balance by financial class and patient type at 12/31/96

Conclusion Based on the test work I performed above, it appears the client's contractual allowance for Medicare is adequate.

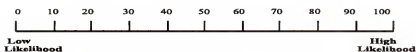
Financial Statement and Staff Rating Task.

1. Please assume that the errors you identified during the review have been corrected.

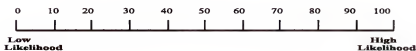
Rate your overall perceived likelihood that the hospital's accounts receivable and related accounts (e.g allowance for uncollectible accounts) contain **any remaining** material misstatement. Place an (X) on the scale below to indicate your assessment.



2. If a material misstatement exists in the accounts receivable and related accounts, what is the likelihood that the **staff auditor** detected the material misstatement? Place an (X) on the scale below to indicate your assessment.



3. If a material misstatement exists in the accounts receivable and related accounts, what is the likelihood that the root cause of this error is a fraudulent activity? Place an (X) on the scale below to indicate your assessment.



Please record the time you finished your review _____

Banking Case**BOOKLET 2****Sun City National Bank**

Hanson and Claude, CPAs, your employer, has assigned you as the in-charge senior for the current year audit (fiscal year ended December 31, 1996) of Sun City National Bank. Richard Gates, a second year staff auditor with one year's **banking industry** audit experience, completed the detailed audit tests on Sun City National Bank loans receivable and the allowance for uncollectible loans or loan loss reserves. Richard Gates submitted the work papers to you for review.

You are asked to complete the following:

1. Read the background information on Sun City National Bank.
2. Make a preliminary judgment about (a) the likelihood of material misstatements in the financial statements and (b) the likelihood that the **staff auditor** detected such misstatements
3. (a) Review the working papers which include a partial audit program for loans receivable, unaudited balance sheet and income statement, and Richard's working papers which include a lead sheet, schedules, audit memos, and conclusions.

(b) Prepare any necessary review notes or comments using the preprinted work paper that is provided in this packet.
4. Make a final judgment about (a) the likelihood of material misstatements in the financial statements and (b) the likelihood that the staff auditor detected such misstatements.
5. Complete a post-study questionnaire.
6. You may assume that work papers that are **NOT** included in this packet are properly prepared and references to these working papers are correct.

As the in-charge senior, you are aware that your work may be reviewed by the audit manager.

BOOKLET 2

Background Information on Sun City National Bank.

Company Overview:

Sun City National Bank was incorporated on August 30, 1970. The bank is a medium size financial institution with its principal office located in Sun City, a city of 300,000 people. The bank's fiscal year ends on December 31. At the end of 1996, unaudited net assets were \$275 million. Total revenues for 1996 were \$16.6 million. At the end of 1996, net loans receivable were approximately \$122 million compared to \$117 million in 1995.

For more than 10 years, the bank has positioned itself in the consumer loan market. However, in recent years, the bank's loan portfolio has included a significant amount of construction and commercial loans backed by real estate properties. For example, in 1986, 5% of Sun City National Bank loan portfolio consisted of construction loans. In 1996, this percentage had grown to 25%. In 1996, the bank's peer group average for construction loans as a percentage of loan portfolios was 15%. The bank's allowance for loan losses as a percentage of loan receivable in 1996 is 1.94% compared to the industry average of 2.25%.

The bank's clientele includes local real estate developers, industrial construction contractors, farmers, and small business commercial borrowers. Sun City has one major company, Diqua Nuclear Power plant and one industry, farming. The bank's policy has been to support the local Sun City economy as much as possible. In fact, Sun City community made it known to the bank that they are willing to put up with some inconveniences in exchange for jobs. The bank's loan program in Sun City has benefitted many local merchants. One recent beneficiary is Metalodrum, Inc., a metal plating firm and the second largest employer in Sun City. The company was facing financial crisis due to a breakdown of one of its two metal plating assembly lines. The bank came to the rescue by granting the company a major loan to repair the broken assembly line and to avert the possibility of laying off many workers. The assembly line had been plagued by mechanical problems. The bank is proud that it provided the much needed capital to repair the assembly line and keep jobs in the community. The bank knows that they are among a handful of banks who are willing to take business risks to help their communities survive and prosper.

Hanson and Claude, CPAs are Sun City National Bank's external auditors. The firm has assessed the top management of the bank to be of high integrity with a good reputation in the community. The firm has also determined the level of reliance on the internal controls through inquiry, observation, and a walk-through of actual transactions and decided to

place some reliance on the internal controls procedures in reviewing the bank's lending relationships, loan review functions, and methodology for estimating loan reserves.

Loan Review:

The senior lending officer is John Jacobs and the credit analyst is Laura Murphy. Both are responsible for loan review and qualifying borrowers for SBA loans. Laura Murphy has an assistant, Jenny Kite, a recent college graduate with limited credit analysis experience. Kite also assists Murphy to provide coverage in the lobby for customers. Apparently, Murphy and Kite have additional responsibilities other than credit analysis and loan review.

Monthly review reports of loans are sent to a loan review committee made up of the credit analyst and loan officers. The review committee holds meetings regularly but these meetings were for loan upgrades rather than for downgrades.

The Audit Plan:

Upon the completion of the current year planning memorandum, Hanson and Claude classified Sun City National Bank's overall audit risk as high. They based their assessment on the bank's increased portfolio of construction and real estate loans relative to the industry's peer group portfolio, which is shown below. Thus, Hanson and Claude are concerned about the bank's methods for estimating the value of their loan portfolios. They planned to look more closely at whether, (1) customer loans are stated and recorded correctly, (2) adequate allowance is provided for loan losses, (3) collateral is adequate for each loan, and (4) amounts received or losses charged off on loans are properly recorded.

1996 ratio of Loan Loss Reserve to:		<u>Sun City National</u>	<u>Peer Group</u>
1.	Year-end-loans	1.94%	2.40%
2.	Net Charge-off	7.1 times	10.5 times
3.	Nonperforming loans	35%	40%

Hanson and Claude also know that regulatory agencies such as the FDIC, SEC, and OCC regularly review or oversee the financial operations of banks by performing periodic audits to identify or quantify non-performing loans and other impaired assets in a bank's portfolio. Hanson and Claude will take this into account and place some reliance on the bank's internal control procedures.

BBB

SUN CITY NATIONAL BANK
Statement of Condition
FYE 12/31/96
(000s)

	1996	1995
	(Unaudited)	(Audited)
Assets		
Cash and due from banks	\$10,000	\$8,000
Federal funds sold	15,680	6,000
Investment securities	120,000	112,000
Loans	125,000	120,000
Allowance for loan losses	(2,420)	(2,700)
Properties and equipment, net	4,740	4,500
Accrued income and other assets	2,000	2,200
Total assets	<u>275,000</u>	<u>250,000</u>
Total Deposits	250,000	228,000
Accrued expenses and other liabilities	1,000	2,000
Total liabilities	<u>251,000</u>	<u>230,000</u>
Total shareholder's equity	<u>24,000</u>	<u>20,000</u>
Total liabilities and capital	<u><u>\$275,000</u></u>	<u><u>\$250,000</u></u>

BBR

SUN CITY NATIONAL BANK
Income Statement
Year ended December 31
(in 000s)

	1996	1995
	(Unaudited)	(Audited)
Interest Income		
Interest and fees on loans*	\$9,000	\$8,000
Interest on investment securities:	4,000	4,100
Taxable/Tax-exempt interest	3,000	2,500
Interest on funds sold	600	300
Total interest income	<u>16,600</u>	<u>14,900</u>
Total interest and noninterest expense**	<u>5,200</u>	<u>4,600</u>
Net interest income	11,625	10,300
Provision for loan losses	(45)	(30)
Net interest income after provision	<u>\$11,580</u>	<u>\$10,270</u>

Comment

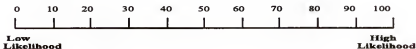
*This figure includes \$226,000 interest on Janet John's \$2,500,000 loan. Janet has not made any interest or principal payment on her loans for 18 months. The senior lending officer says the bank does not expect any loss on this loan because the bank holds the right to sell off John's marketable securities if John defaults on her obligations. The securities are currently worth \$2,600,000.

**Net interest expense included \$200,000 the bank charged off in December in respect of Allison Juket's non-performing loan.

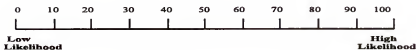
Financial Statement and Staff Rating Task.

1. Please rate your overall perceived likelihood that the bank's loan receivable and related accounts (e.g. allowance for loan and lease losses) contain a material misstatement.

Place an (X) on the scale below to indicate your assessment.



2. If a material misstatement exists in the loan receivable and the related accounts, what is the likelihood that the staff auditor detected it? Place an (X) on the scale below to indicate your assessment.



Please record the time you begin your review _____.

Sun City National Bank
Partial Loan Loss and Allowances for Loan Losses Audit Program
FYE 12/31/96

Audit Objective:

1. Provisions and discounts and related amortization and accretions are recorded.
2. Loans represent advances to bonafide customers and are owned by the entity.
3. Adequate allowance is provided for uncollectible loans and individual loans, and other credits are charged off when uncollectible and amounts received on loans and other credits previously charged off are properly recorded.

Audit Procedure:

	<u>Done By</u>	<u>W/P Ref</u>
1. Review reasonableness of interest accruals and interest income for loan receivables.	RG	BBB, BBR
2. Review the internal controls in place to monitor the allowance on timely basis.	RG	B-Memo
3. Analyze trends in portfolio mix, charge-offs, recoveries, and delinquencies.	RG	B-2, B-5-3
4. Review allowance statistics against historical experience.	RG	B-Memo
5. Perform audit file review for selected borrowers and conclude on the adequacy of the client's reserve for current year.	RG	B-6
6. Perform procedures to test whether the company has properly accounted for material loan loss contingencies and material troubled debt restructuring.	RG	B-5-2, B-6 B-5-3
7. Re-estimate or re-calculate the allowance for loan loss and conclude on its adequacy.	RG	B-6,
8. Review working papers and conclude on the reasonableness of the loan receivables and the allowance for uncollectible accounts.		

B-Memo
Done by RG
12/31/96

Sun City National Bank
Memo re: Loan Processing Loan Review and Loan Loss Reserves
FYE 12/31/96

Purpose:

To document Hanson and Claude's understanding of the client's loan processing procedures and the methodology for establishing loan loss reserves.

A credit report is required to support an application for a loan before making a credit decision. The loan officer may approve loans less than \$10,000. However, the loan officer obtains concurrent approval from the president and senior lending officer for unsecured loans between \$10,000 and \$40,000. Unsecured loans greater than \$40,000 and up to \$75,000 must be approved by a loan committee. Secured loans can be approved by the president and senior lending officer. The conditions emphasized in granting a loan include (1) the ability of the client to pay and (2) the existence of collateral.

The bank has several monitoring functions in place to identify loan and asset credit quality. They are: (1) Loan review function, (2) Quarterly review of (a) loans greater than \$5,000 and (b) the provision of loan loss reserves by the senior lending officer, (3) Continuous contact by the loan officer with the customer, and (4) Monthly reports of renewed and past due loans reviewed by senior bank officials.

Loan Loss Reserves:

Sun City National Bank estimates loan reserves each quarter by reviewing loans with outstanding balances greater than \$5,000 and evaluating each customer's repayment history and the collateral for the loan. With the review, the bank determines what the bank's possible losses are, as well as what the worst case scenario might be. They then evaluate the adequacy of reserves, adding an additional 5% to the reserves to accommodate unanticipated or miscellaneous losses. The bank maintains no specific policy for providing a reserve for individual loans, rather, the bank uses the amount it determines from the review as the basis for total reserves.

The bank president said that there is no direct correlation between the credit rating assigned to loans and their associated reserve. However, he believes that the bank's estimated loan loss reserve, in the end, approximates the loss reserves that could be

estimated based on the credit ratings system recommended by the regulatory agencies. Below is the recommended rating system.

Regulatory Recommended Credit Risk Rating System for Bank Loans.

<u>Credit Grade</u>	<u>Description</u>	<u>Recommended Reserve rate</u>
1	Cash Secured	0.005%
2	Investment Grade (A)	0.005%
3,4	Standard Unsecured, Standard Secured	0.005%
5	OAEM/30 days past due**	15.00%
6	Substandard/60 days past due	20.00%
7	Doubtful/90 days past due	50.00%
8	Loss.	100.00%

**OAEM -Other Assets Especially Mentioned. The Bank's current provision for loan loss reserves is 6-7 times greater than the amount needed to cover current year charge-offs.

B-6

Prepared by RG

12/31/96

**Sun City National Bank
Memo: Summary of Selected Review of Borrowers
FYE 12/31/96**

Purpose:

To document the review of selected bank borrowers, their characteristics, nature of business, types and purpose of loans, terms, sources of repayment and current exposure.

Discussion:

I selected three borrowers, two from the construction loan account and one from the commercial loan account. I selected these loans because they are part of the income earning assets of the bank. Supporting documents include the loan application and the borrower's file since the origination of the loan.

Two loans are unclassified. These are loans made to Sid Jones (Northern Construction Company) and Sigler Construction Company.

One loan is classified as a loss. This loan is made to Paul Lucas of Lucas Auto Parts.

Analysis:

A comprehensive review of each selected outstanding loan is documented below. I have determined from this analysis and related work papers that the quality of loans generally continues to improve. This is reflected in the migration of loans from criticized to unclassified in B-5-2.

During the test, it was noted that smaller loan amounts ranging between \$500 and \$750 were made to about 5,250 bank customers. Only a handful of them have documentation. The bank does not currently have a periodic review policy for smaller loans. The bank felt that the administrative cost for establishing a periodic review for these smaller loans is too high. However, they assured me that they are adequately providing for any exposure to risk.

B-6**Summary of Review of Selected Borrowers:**

Borrower 1: Sid Jones owns Northern Construction Company, a real estate construction and development company.

Purpose of Loan: To make a down payment on a lot for building fourplex apartment units.

Amount of Loan: \$500,000 loan with maturity date 7/1/2000.

Outstanding amount: \$350,000

Payment arrangement: Interest and payment of principal due in equal semi-annual installment of \$20,000

Financial Data: Northern Construction financial data in 1996 and 1995 are:
1996: Total assets \$2.10 million. Net worth \$1.65 million.
1995: Total assets \$0.92 million. Net worth \$0.74 million.

Collateral: Second security/deed on the lot of land on Rt. 556 Monroe

Credit Classification: Not classified.

Notes:

1. Jones' net worth consist of 90% real estate equity in 1996.
2. JNL Savings and Loan made the construction loan to build the fourplex units.
3. Jones also borrowed money from another bank in the city. This amount is enough to retire the second trust on the lot.
4. The apartment units were completed in 1996 and are 60% occupied.
5. Diqua Nuclear Power, the second largest employer in the city shut its operations early 1996 and laid off over 750 employees.
6. Jones continues to make timely monthly payments on the principal and interest.
7. Jones' background history prior to owning Northern Construction Company.
1985- real estate broker.
1987- life and health insurance sales person.
1989- auto sales representative.

My discussions with bank officials indicate that they are not sure of the continuance of the loan. The bank does not seem to be in an immediate risk of exposure since the borrower is meeting the contractual obligations.

Borrower 2:	Sigler Construction Company June Sigler, 42 years old, owns and manages Sigler Construction Company, an irrigation and canal construction venture.
Purpose of loan:	To buy irrigation equipment.
Amount of total loan:	\$5,000,000 at 8% interest.
Maturity Date:	12/31/2000
Outstanding amount:	\$4,505,750
Repayment Arrangement:	10% loan amount and semi-annual interest payment on 6/30 and 12/31.
Collateral:	First security in accounts receivables (retention fees).
Credit Classification:	Not Classified.

Notes and Summary:

Sigler construction rebuilt a local irrigation system that supports local economy for the full contract and a retention fee of \$5,000,000. FEMA (Federal Emergency Management Advisory) funded the rebuilding project by awarding a series of grants to Alcoa Valley Irrigation District which operates the local irrigation system.

The Project was completed in mid-1995 and Sigler was paid the full contracted amount for the project but has not been paid the retention fees. Alcoa Valley who retained Sigler won't pay Sigler because they have not received additional funds from FEMA with respect to this contract. FEMA notified Alcoa Valley that it would not receive funds from FEMA until FEMA completes an audit of Alcoa's project. Alcoa had borrowed money by pledging the retention fees as accounts receivable collateral.

Faced with this uncertainty, Sigler in October 1996 told the bank she would be unable to make additional regularly scheduled payments on the loan for the next five years. However, Sigler indicated to the bank that he would begin to make

regular scheduled payments and pay the principal in 2000. The present value of the loan at December 31, 1996 is \$4,000,000. The present value of this amount to be received in ten periods (5 years) is \$2,500,000.

Comment and Conclusion: The bank should write down the loan amount to its present value.

Borrower: 3 Lucas Auto Parts
Paul Lucas, owns and operates Lucas Auto Parts store. He bought the auto parts store from John Butt with his own financing.

Purpose of Loan: To purchase inventory for his auto store.

Amount of loan: \$50,000 on 12/30/1992, with maturity date of 12/31/1997

Outstanding loan: \$20,000

Repayment arrangement: Semi-annual payment of \$5,000

Collateral: Second lien on accounts receivable and store inventory.

Credit Classification: Loss

Notes and Summary:

The supplier to the auto parts store had guaranteed a note held by John Butt, previous owner, from whom Paul Lucas had bought the store. When Lucas bought the store from John Butt, he was unaware that he was also subject to the supplier's requirement that the auto parts store's inventory must stay above \$50,000 to avoid any foreclosure. In 1995, the supplier notified the bank that it had foreclosed on the auto parts store. Lucas' inventory at that time was \$35,000.. The supplier took over the store. Lucas took the supplier to court on 12/30/95. The case lasted for 12 months, however, Lucas won and got his store back. Lucas paid the bank the sum of \$25,000 on December 26, 1996. Lucas also had \$15,000 outstanding overdraft at the bank on 12/31/1996

Comments and Conclusion: The bank should write off the loan.

BB

Prepared by: RG

Date: 12/31/1996

SUN CITY NATIONAL BANK**Loans Lead Sheet****FYE 12/31/96**(in
000s)

Account Description	Balance		Balance		% \$inc (dec)	%change
	12/31/96	%	12/31/95	%		
Commercial.	\$18,000	14	\$20,000	17	(\$2,000)	(10)
Commercial-Participation	(1,500)	(1)	(1,540)	(1)	40	(3)
Construction Loans.	31,000	25	25,500	21	5,500	22
Mortgage-Loan	73,000	58	63,600	53	9,400	15
Mortgage-Participation	(380)	(0)	10	0	(390)	(3,900)
Non accrual	(4,000)	(3)	3,200	3	(7,200)	(225)
Participation	1,800	1	1,980	2	(180)	(9)
Home Equity	520	0	560	0	(40)	(7)
Fast Overdraft	700	1	140	0	560	400
Credit Cards	1,640	1	1,460	1	180	12
Overdraft	220	0	90	0	130	144
Others	4,000	3	5,000	4	(1,000)	(20)
Gross Loans	\$125,000	100	\$120,000	100	\$6,000	5.00
Allowance for Loan Loss	(2,420)		(2,700)		280	(10.37)
Net Loans	\$122,580		\$117,300			

Comment:

1. The client is not reflecting non-accrual loans separately at 12/31/96.

B-2

Prepared by: RG

Date: 12/31/1996

SUN CITY NATIONAL BANK
Roll Forward of allowance Account
FYE 12/31/96
(in 000s)

Beginning balance as reported	\$2,700	BBB
Unadjusted Balance	<u>105</u>	
Corrected beginning Balance	2,805	
Less charge offs	(545)	B-5
Add recoveries	115	B-10
Current year provision	<u>45</u>	
Balance 12/31/96	<u><u>2,420</u></u>	

The \$105,000 represents a reclass made by Hanson and Claude in the prior year.

B-5-2

Prepared by: RG

Date: 12/31/96

SUN CITY NATIONAL BANK
Comparison of Credit Allocation
FYE 12/31/96
(in 000s)

Credit Grade		Outstanding Balances					
Grade		1996	% Total	1995	% of Tot	\$ Change	% Change
Unclassified	1	\$7,500	6	\$4,800	4	\$2,700	56
	2	21,250	17	24,000	20	(2,750)	(11)
	3	81,250	65	68,400	57	12,850	19
	4	6,250	5	13,200	11	(6,950)	(53)
Total- Unclassified		116,250		110,400			
OAEM		1,250	1	1,200	1	50	4
Substandard		7,375	6	8,400	7	(1,025)	(12)
Doubtful		0	0	0	0	0	
Loss		125	0.1	0	0	125	
Total Loans		\$125,000	100	\$120,000	100		

Purpose:

To document the client's allocation of outstanding loans among its various credit grades to accounts from prior year.

Analysis:

Results of analysis on this working paper reflects a normal improvement on the loan portfolio. Substandard loans have decreased significantly and there has been an overall migration of balances to better grades. Overall a greater percentage of the client's loans are uncriticized assets.

B-5-3

Prepared by: RG

Date: 12/31/96

SUN CITY NATIONAL BANK
Estimated Loan Loss Reserve
FYE 12/31/96
(in 000s)

Specific:

Name of Entity	Amount of Loan	Applied Rate*	Reserve
Sigler Construction Company	\$5,000	0.005	25

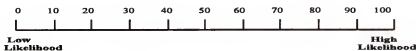
General Reserve:

Loan Category	Amount of Loan	Applied Rate	Reserve
Unclassified	\$111,250	0.005	\$556
OAEM	1,250	0.15	188
Substandard	7,375	0.20	1,475
Doubtful	0	0.50	0
Loss	125	1.00	125
Total	\$120,000		2,344
Actual Reserve			2,420
Excess(deficit) Reserve			51

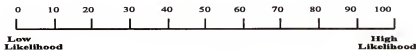
* See B-Memo for recommended rates.

Financial Statement and Staff Rating Task.

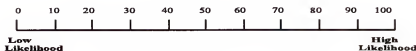
- Please assume that the errors you identified during the review have been corrected.
Rate your overall perceived likelihood that the bank's loan receivable and related accounts (e.g allowance for loan and lease losses) contain **any remaining** material misstatement. Place an (X) on the scale below to indicate your assessment.



- If a material misstatement exists in the loan receivable and the related accounts, what is the likelihood that the staff auditor detected it? Place an (X) on the scale below to indicate your assessment.



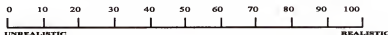
- If a material misstatement exists in the loans receivable and related accounts, what is the likelihood that the root cause of this error is a fraudulent activity? Place an (X) on the scale below to indicate your assessment.



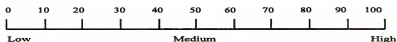
Please record the time you finished your review _____

POST-SURVEY QUESTIONNAIRE

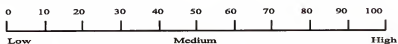
1. Gender: ☐Male ☐Female
2. Are you a CPA? ☐Yes ☐No
3. Age group: ☐21-25 ☐25-30 ☐31-35 ☐36-40 ☐41-45 ☐46-50 ☐Over 50
4. Position within the firm: ☐Staff ☐Senior ☐Manager ☐Snr. Manager
☐Partner
5. Years of audit experience _____
6. Area of specialization: ☐Health care ☐Banking ☐Other, specify _____
7. Years of audit experience in: ☐health care industry _____, ☐banking industry _____
8. Indicate the average proportion of your billable time you have spent reviewing work papers in: ☐health care audits _____%, ☐banking audits _____%.
9. Other work experience in areas of specialization. Please explain. _____
10. Other audit related specializations, if any. Please explain _____
11. Place an (x) on the scale below to indicate the realistic nature of the working papers in this study



12. Rate your ability to perform an audit in **healthcare** by placing an (x) on the scale below.



13. Rate your ability to perform an audit in **banking** by placing an (x) on the scale below.

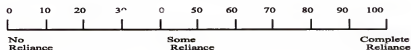


14. You were informed about the **staff auditor's industry specialization** before you reviewed their work.

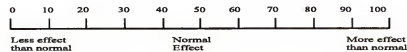
- (a) Indicate **your reliance** on the **staff auditor's healthcare industry specialization** when reviewing **her healthcare audit work papers** by placing an (x) on the scale below.



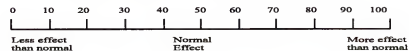
- (b) Indicate **your reliance** on the **staff auditor's banking industry specialization** when reviewing **his banking audit work papers** by placing an (x) on the scale below.



15. (a) Indicate how knowing the **staff auditor's healthcare industry specialization** affected your **level of effort** when reviewing **her healthcare audit work papers** by placing an (x) on the scale below.



- (b) Indicate how knowing the **staff auditor's banking industry specialization** affected your **level of effort** when reviewing **his banking audit work papers** by placing an (x) on the scale below.



APPENDIX B

ERROR RATING TASK

Healthcare-case

Dear Participant:

Thank you for your participation in this study. It is supported by a KPMG Peat Marwick Doctoral Fellowship. This study asks you to provide information on errors that occur in the health care industry. In particular, you will be asked to (1) rate the relative frequency of the errors, (2) rate the importance of the errors, (3) indicate which member or members of the audit team is likely to detect those errors and whether an auditor who does not have specialization in the health care industry would detect each error, and (4) indicate whether each error is mechanical or judgmental. Your participation in this study is important to developing an understanding of how the frequency, importance, and detectability of such errors affect the effectiveness and efficiency of the audit review process. You have been selected to participate in this study because of your experience with health care audits. This study should take approximately 15 minutes to complete.

Please return the completed materials directly to me by (insert date) using the enclosed addressed, stamped envelope.

Sincerely,

Vincent Owoso
KPMG Peat Marwick Minority Accounting Doctoral Fellow
Department of Accountancy
Bentley College
Waltham, MA 02154

Frequency of Selected Errors in the Health Care Industry

Instructions:

Please rate the **frequency** of occurrence for the following errors in the following manner. Assign the number 100 to the most frequent type of error, and then values between 1 and 99 to the remainder depending on how frequently they occur compared to the error assigned 100. This frequency judgment should relate to your estimation of the relative frequency of occurrence of those errors in all entities operating in the health care industry. This estimate may be based on your direct or indirect experience on previous audits, discussion with associates, or firm training.

Description of Error	Relative Frequency
1. HMO accounts included in Medicare contractual adjustment report.	
2. Allowance for uncollected accounts has not been adjusted for current period recoveries.	
3. Fund Balance does not roll.	
4. Failure to record current period contingent liability for prior period over billing of Medicare.	
5. Current period Medicare receivables are not properly contractualized.	
6. Current period HMO receivables are not properly contractualized.	
7. Failure to separate Medicare and Medicaid patient's charges.	
8. Billing Medicare for patient charges that are more than allowable DRG charges.	
9. Billing Medicare for non-covered and full outpatient charges.	
10. Current period revenue reduced for prior year Medicare adjustment instead of recognizing a liability.	
11. Allowance for uncollectible accounts in balance sheet does not match the balance from test of details.	
12. Credits, co-payments, and deductions larger than normal.	
13. Clean up of accounts receivable at year end.	

Importance of Selected Errors in the Health Care Industry

Instructions:

Please rate the importance of the following errors in the health care industry in the following manner. Assign the number 100 to the error that is the most important, and values between 1 and 99 to the remainder depending on how important they are compared to the error assigned 100. In rating the importance of each error, consider how *material, critical, and consequential*, it would be on a typical health care audit.

Description of Error	Relative Importance
1. HMO accounts included in Medicare contractual adjustment report.	
2. Allowance for uncollected accounts has not been adjusted for current period recoveries.	
3. Fund Balance does not roll.	
4. Failure to record current period contingent liability for prior period over billing of Medicare.	
5. Current period Medicare receivables are not properly contractualized.	
6. Current period HMO receivables are not properly contractualized.	
7. Failure to separate Medicare and Medicaid patient's charges.	
8. Billing Medicare for patient charges that are more than allowable DRG charges.	
9. Billing Medicare for non-covered and full outpatient charges.	
10. Current period revenue reduced for prior year Medicare adjustment instead of recognizing a liability.	
11. Allowance for uncollectible accounts in balance sheet does not match the balance from test of details.	
12. Credits, co-payments and deductions larger than normal	
13. Clean up of accounts receivables at year end	

Detection of Selected Errors by Audit Team Member

Instructions:

Indicate which member or members of an audit team specializing in health care audit is likely to detect each error. More than one audit team member can be checked for each error. The detectability of an error relates to your estimation that each member of the audit team (e.g., senior, manager, and partner) will detect each error on an audit of a health care company. Also, please indicate whether an auditor who does not have specialization in the health care industry would detect each error.

Description of Error	Health care Specialists			Non Health-care auditor	
	Senior	Manager	Partner	Yes	No
1. HMO accounts included in Medicare contractual adjustment report.					
2. Allowance for uncollected accounts has not been adjusted for current period recoveries.					
3. Fund balance account does not roll.					
4. Failure to record current period contingent liability for prior period over billing of Medicare.					
5. Current period Medicare receivables are not properly contractualized.					
6. Current period HMO receivables are not properly contractualized					
7. Failure to separate Medicare and Medicaid patient's charges.					
8. Billing Medicare for patient charges for more than allowable DRG charges.					
9. Billing Medicare for non-covered and full outpatient charges.					
10. Current period revenue reduced for prior year Medicare adjustment instead of recognizing a liability.					

11. Allowance for uncollectible accounts in the balance sheet does not match the balance from test of details.					
12. Credits, co-payment, and deductions larger than normal.					
13. Clean up of accounts receivable at year end					

Type of Selected Error

Instructions:

Please indicate whether each of the following errors is a mechanical or judgmental error. Mechanical errors are errors that require little or no subjective judgment on the part of the auditor. Judgmental errors, on the other hand, require significant subjective judgment on the part of the auditor.

Description of Error	Mechanical Error	Conceptual Error
1. HMO accounts included in Medicare contractual adjustment report.		
2. Allowance for uncollected accounts has not been adjusted for current period recoveries.		
3. Fund Balance does not roll.		
4. Failure to record current period contingent liability for prior period over billing of Medicare.		
5. Current period Medicare receivables are not properly contractualized.		
6. Current period HMO receivables are not properly contractualized.		
7. Failure to separate Medicare and Medicaid patient's charges.		
8. Billing Medicare for patient charges that are more than allowable DRG charges.		
9. Billing Medicare for non-covered and full outpatient charges.		
10. Current period revenue reduced for prior year Medicare adjustment instead of recognizing a liability.		
11. Allowance for uncollectible accounts in balance sheet does not match the balance from test of details.		
12. Credits co-payments, and deductions larger than normal		
13. Clean up of accounts receivable at year end.		

POST-SURVEY QUESTIONNAIRE

1. Position within the firm: ☐Manager ☐Senior Manager ☐Partner
2. Years of audit experience _____
3. Years of audit experience in the health care industry _____
4. Do you have any other work experience in health care industry other than audit related?
☐Yes ☐No. If yes, please explain.
5. Do you have any other audit related specializations? ☐Yes ☐No
If yes, please explain.

Banking Case

Dear Participant:

Thank you for your participation in this study. It is supported by a KPMG Peat Marwick Doctoral Fellowship. This study asks you to provide information on errors that occur in the **banking** industry. In particular, you will be asked to (1) rate the relative frequency of the errors, (2) rate the importance of the errors, (3) indicate which member or members of the audit team is likely to detect those errors and whether an auditor who does not have specialization in the banking industry would detect each error, and (4) indicate whether each error is mechanical or judgmental. Your participation in this study is important to developing an understanding of how the frequency, importance, and detectability of such errors affect the effectiveness and efficiency of the audit review process. You have been selected to participate in this study because of your experience with banking audits. This study should take approximately 15 minutes to complete.

Please return the completed materials directly to me by (insert date) using the enclosed addressed, stamped envelope.

Sincerely,

Vincent Owoso
KPMG Peat Marwick Minority Accounting Doctoral Fellow
Department of Accountancy
Bentley College
Waltham, MA 02154

Frequency of Selected Errors in the Banking Industry

Instructions:

Please rate the **frequency** of occurrence for the following errors in the following manner. Assign the number 100 to the most frequent type of error, and then values between 1 and 99 to the remainder depending on how frequently they occur compared to the error assigned 100. This frequency judgment should relate to your estimation of the relative frequency of occurrence of those errors in all entities operating in the banking industry. This estimate may be based on your direct or indirect experience on previous audits, discussion with associates, or firm training.

Description of Error	Relative Frequency
1. Current period revenue includes interest income from non accrual loans.	
2. Current period revenues reduced by charged-off loans.	
3. Allowance for uncollectible loans not fully recorded.	
4. Revenues recorded but not earned due to misclassification of loans.	
5. Current year recoveries not recorded or understated.	
6. Interest payments received on non performing loans not treated on cash basis.	
7. Re-estimated allowance for loan loss reserve are more than reported allowance due to misclassification of loans.	
8. Payments received on written-off loans are used to reduce loan principal instead of re-instituting the loss and recognizing revenue.	
9. Loans are mis-classified.	
10. Allowance for uncollectible loans in the balance sheet does not match the balance from test of details.	
11. Payments received on non accrual/non performing loans are used to reduce loan principal instead of recognizing interest revenue.	

Importance of Selected Errors in the Banking Industry

Instructions:

Please rate the importance of the following errors in the banking industry in the following manner. Assign the number 100 to the error that is the most important, and values between 1 and 99 to the remainder depending on how important they are compared to the error assigned 100. In rating the importance of each error, consider how *material, critical, and consequential* it would be on a typical banking audit.

Description of Error	Relative Importance
1. Current period revenue includes interest income from non accrual loans.	
2. Current period revenues reduced by charged-off loans.	
3. Allowance for uncollectible loans not fully recorded.	
4. Revenues recorded but not earned due to misclassification of loans.	
5. Current year recoveries not recorded or understated.	
6. Interest payments received on non performing loans not treated on cash basis.	
7. Re-estimated allowance for loan loss reserve more than reported allowance due to misclassification of loans.	
8. Payments received on written-off loans are used to reduce loan principal instead of re-instituting the loss and recognizing revenue.	
9. Loans are mis-classified.	
10. Allowance for uncollectible loan balance sheet does not match the balance from test of details.	
11. Payments received on non accrual/non performing loans are used to reduce loan principal instead of recognizing interest revenue.	

Detection of Selected Errors by Audit Team Member

Instructions:

Indicate which member or members of an audit team specializing in banking audit is likely to detect each error. More than one audit team member can be checked for each error. The detectability of an error relates to your estimation that each member of the audit team (e.g., senior, manager, and partner) will detect each error on an audit of a banking company. Also, please indicate whether an auditor who does not have specialization in the banking industry would detect each error.

Description of Error	Banking Specialists			Non Banking auditor	
	Senior	Manager	Partner	Yes	No
1. Current period revenue includes interest income from non accrual loans.					
2. Current period revenues reduced by charged-off loans.					
3. Allowance for uncollectible loans not fully recorded.					
4. Revenues recorded but not earned due to misclassification of loans.					
5. Current year recoveries not fully recorded or understated.					
6. Interest payments received on non performing loans not treated on cash basis.					
7. Re-estimated allowance for loan loss reserve more than reported allowance due to misclassification of loans.					
8. Payments received on written-off non loans are used to reduce loan principal instead of re-instituting the loss and recognizing revenue.					
9. Loans are mis-classified.					
10. Allowance for uncollectible loan balance sheet does not match the balance from test of details.					

11. Payments received on non accrual/non performing loans are used to reduce loan principal instead of recognizing interest revenue.					
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Type of Selected Error

Instructions:

Please indicate whether each of the following errors is a mechanical or judgmental error. Mechanical errors are errors that require little or no subjective judgment on the part of the auditor. Judgmental errors, on the other hand, require significant subjective judgment on the part of the auditor.

Description of Error	Mechanical error	Conceptual error
1. Current period revenue includes interest income from non accrual loans.		
2. Current period revenues reduced by charged-off loans.		
3. Allowance for uncollectible loans not fully recorded.		
4. Revenues recorded but not earned due to misclassification of loans.		
5. Current year recoveries not recorded or understated.		
6. Interest payments received on non performing loans not treated on cash basis.		
7. Re-estimated allowance for loan loss reserve more than reported allowance due to misclassification of loans.		
8. Payments received on written-off loans are used to reduce loan principal instead of re-instituting the loss and recognizing revenue.		
9. Loans are mis-classified.		
10. Allowance for uncollectible loan balance sheet does not match the balance from test of details.		
11. Payments received on non accrual/non performing loans are used to reduce loan principal instead of recognizing interest revenue.		

POST-SURVEY QUESTIONNAIRE

1. Position within the firm ☐Manager ☐Senior manager ☐Partner
2. Years of audit experience _____
3. Years of audit experience in the banking industry _____
4. Do you have any other work experience in banking industry other than audit related?
☐Yes ☐No
If yes, please explain.
5. Do you have any other audit related specializations? ☐Yes ☐No
If yes, please explain.

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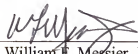
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BIOGRAPHICAL SKETCH

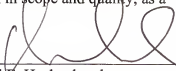
Vincent Eseme Owhoso was born on May 23, 1956, in Ughelli, Nigeria. He completed his Bachelor of Arts in Chemistry and Bachelor of Science in Business Administration degrees in 1983 and 1984, respectively, from Berea College, Berea, Kentucky. He completed his Master of Business Administration degree in 1986 from Eastern Kentucky University, Richmond, Kentucky. He was employed as a district manager at First Investor's Corporation from 1987 to 1989. He entered the Graduate School of the University of Florida in August 1989. Since September, 1996, he has been employed as an assistant professor at Bentley College in Waltham, Massachusetts, in the Department of Accountancy.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



William F. Messier, Jr., Chairman
Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



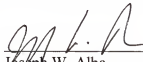
Karl E. Hackenbrack
Associate Professor of Accounting

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Doug Snowball
Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



Joseph W. Alba
Professor of Marketing

This dissertation was submitted to the Graduate Faculty of the Fisher School of Accounting in the College of Business Administration and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 1998



Dean, Graduate School